THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

COMPUTERWORLD

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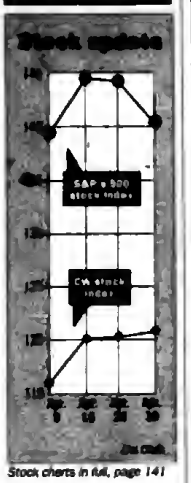

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Dexpo South attracts 7,000 DEC users, while third-party vendors grumble about new policies preventing add-on devices. **Page 14.**

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Telecommunications industry turmoil spells opportunity for venture capitalists. **Page 31.**

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Users rate the Data General MV/20000 and MV/2000 models. **Page 43.**

■

Users of Wang Laboratories equipment are objecting to a new Wang policy that they say charges for all software maintenance support and will begin on July 1. "When Wang gets its service to a level worth paying for, then we'll talk," one user said. Wang spokesmen were not able to comment by press time.

■

The troubled Federal DP & Communications Conference, scheduled for this week in Washington, D.C., was canceled last week by the Interface Group. A spokesman said budget cuts were keeping federal employees away. The 1986 show had been in big trouble since its inception; Interface postponed the show from its original March dates, dropped

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FCC tickets 2,500 units in Comdex raid

By Douglas Barney

ATLANTA — Six Federal Communications Commission employees swooped down onto the show floor of Comdex/Spring '86 last week, slapping labels on all computer products that failed to meet federal radio frequency emissions regulations.

An estimated 2,500 products were tagged by FCC investigators during the first three days of the popular trade show.

In addition to affixing the labels, which effectively bars the sale of uncertified equipment, FCC officials provided vendors and resellers in attendance at Comdex with information on FCC certification and labeling requirements.

"We encouraged those that have not done it to abide by the rules and regulations to bring them into compliance," said Dorothy Goodrich, a public service specialist involved in the Comdex operation. "There were quite a few surprised faces there."

The FCC's Comdex raid is but one chapter in the agency's recent assault on firms that manufacture or resell computers that do not meet FCC standards. So far, the FCC crackdown has focused mainly on mail-order firms such as PC's Limited, an Austin, Texas, mail-order firm that sells its own brand of machines in addition to other brands of hardware and software.

"We had a couple of products that had not been certified. The application process is somewhat lengthy," said Allen Baden, attorney and assistant to the president for PC's Limited, which has been fined $8,000.

Baden said PC's Limited has since had its product certified and that the experience will help the firm avoid problems in the future. "We have seen some problem serial and parallel ports, so what we are

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Rolm voice linked to VM

IBM office users tied in to voice messaging system

By Elisabeth Horwitt

Phonemail/VM host link, representing the first step toward integrating IBM electronic mail and Rolm Corp. voice messaging systems, is scheduled to be announced jointly today by the two companies, according to a Rolm official.

Phonemail/VM is described as a software option to be offered with Rolm's Phonemail voice messaging systems and will reportedly notify users of messages sent through a VM-based IBM text messaging system such as the Professional Office System.

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Cincom facing relational test

By Charles Babcock

ORLANDO, Fla. — Users of Cincom Systems, Inc.'s large-system software expressed strong interest in the firm's claims about its latest relational data base management system, Supra, at the annual Cincom users conference last week.

Users were also informed of a new release of Cincom's development language, Mantis, due June 1.

Interest in Supra, announced last fall, was heightened by reports that relational DBMS pioneer E. F. Codd is evaluating the Cincom product at his Relational Institute in San Jose, Calif. Preliminary reports, Cincom officials said, indicated that Supra

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CW EXCLUSIVE

McNetwork: Fast-food giant orders ISDN communications

By Elisabeth Horwitt

This December, $3.4 billion fast-food giant McDonald's Corp. will abandon its safe and secure Centrex service for a pilot communications system employing the still-evolving standard, Integrated Services Digital Network.

"The value of information as a strategic asset is increasing rapidly for us," notes McDonald's telecommunications director Patrick Krause. He was a member of the management team that two years ago evaluated the company's voice and data communications systems, assessed future needs and developed a proposal that led to the ISDN pilot test. "Ideally, ISDN will allow us to install one uniform wiring plan and switching vehicle for network access," Krause says.

The emerging ISDN telecommunications standard defines a single set of specifications that will enable digitized voice, data, image and text transmissions to be delivered to the same user terminal over the same channel.

Krause

In addition to uniformity, Krause says, McDonald's hopes to realize substantial savings in equipment, line and service costs by consolidating its transmission facilities under ISDN services supplied by Illinois Bell.

Currently, the company uses a wide variety of switches, controllers, modems and cables to connect data terminals to Wang Laboratories, Inc., IBM and Unix-based hosts; telephone sets to public and dedicated lines; and workstations to data transmission services such as value-added networks, Digital Dataphone Service and WATS.

"We were concerned with long-term viability," Krause says, explaining why McDonald's decided that its 10-year-old telecommunications system was overdue for an overhaul. Although Illinois Bell's Centrex had served them well in the past, he says, McDonald's had become aware of the

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NEWSPAPER

Pan Am exploring DP sharing with American Airlines group

By David A. Ludlum

NEW YORK — Pan American World Airways, Inc. is looking into expanding its cooperation with American Airlines, Inc. in data processing in the wake of Pan Am's agreement to use American's Sabre reservation system.

Pan Am is comparing American's data processing capabilities with its own in weighing further cooperation, according to Robert Wagner, Pan Am's general manager of data systems and communications.

The airlines limited the scope of the Sabre agreement in order to expedite it, Wagner said. The agreement calls for Sabre to provide Pan Am's seating reservations and departure control. It does not cover Pan Am's freight tracking or reservations that Pan Am manages for several Latin American airlines.

In announcing the Sabre agreement late last month, Pan Am Chairman C. Edward Acker said Pan Am will "review other areas in which American's data processing resources could augment Pan American's capability in ... operational and analytical functions."

Reason for move

Wagner said the chief reason for the move to Sabre is its penetration in travel agents' offices. Terminals for Sabre, the largest of five major airline reservations systems in the U.S., sit on 48,000 travel agents' desks, generally under exclusive five-year contracts, he said. The system issues more than half the airline tickets sold in the country, Wagner said.

Pan Am spokeswoman Ann Whyte said the number of terminals for Pan Am's Panamac reservations system on agents' desks is "very, very small."

Sabre already carries listings for Pan Am and other major airlines. The new agreement provides for Pan Am's seating availability, fares and schedules to be reported in real-time, which is not now the case, Wagner said "If one seat is available, you get it," he said.

Benefits for Pan Am

The move also will allow Pan Am to provide customers with boarding passes when they make reservations, automatically record mileage accumulated in frequent-flyer programs and offer other travel services, Acker said.

Panamac is 22 years old and was rewritten in 1973. It was derived from the Programmed Airlines Reservation System application software developed by IBM and uses the ACP/TPF operating system and an IBM 3083 Model BX host processor, Wagner said. He would not say how many workers are involved with the system.

Pan Am hardware and data processing personnel freed up by the move to Sabre will be used to solve other needs where capacity is lacking, including decision support, electronic mail, maintenance and engineering, Wagner said. Pan Am reservation agents will continue to use the Panamac terminals, according to Wagner.

Pan Am said no personnel will be laid off due to the move to Sabre, but a day after announcing the Sabre agreement it said it was laying off 212 of its 1,470 reservations agents because of a decline in business. That decline is because of concern with terrorism in Europe and the Middle East, Wagner said.

In announcing the Sabre agreement, Pan Am and American also said they will integrate their frequent-flyer programs, allowing mileage accumulated under one program to be credited to the other, effective June 1.

Tandem unveils workstations

PC AT compatibles emulate 6530 terminals

By Jeffry Beeler

CUPERTINO, Calif. — In a move to strengthen its distributed processing capabilities, Tandem Computers, Inc. today is set to introduce two IBM Personal Computer AT-compatible workstations that reportedly support Tandem's key communications software products.

Even though both the 6AT/20 and 6AT/40 can operate in a stand-alone mode, they are primarily intended to serve as system terminals and to be integrated into networks that incorporate Tandem's Nonstop mainframes.

In addition to being configured with a program that allows micros to emulate a Tandem Model 6530 terminal, the 6AT/20 and 40 support the vendor's Information Xchange Facility (IXF) software, according to John Gully, manager of product management at Tandem's Austin, Texas, site.

Together, 6530 emulation and IXF reportedly enable the workstations to connect to Tandem hosts through standard access methods and make the two 6ATs compatible with the firm's Pathway transaction processing system.

Distributed processing

One key to the workstations' distributed processing capabilities is their local intelligence and storage capacity. Both units use Intel Corp.'s 80286 microprocessor and support an array of operating systems, including Microsoft Corp. MS-DOS 3.1, Unix and its look-alike — Microsoft's Xenix. The units are expandable to 11M bytes of main memory and 80M bytes of external storage.

A basic 6AT/20 incorporates a 20M-byte disk system and costs $3,995, compared with $4,495 for a minimum 6AT/40, which provides 40M bytes of mass storage.

Both products are available for immediate delivery.

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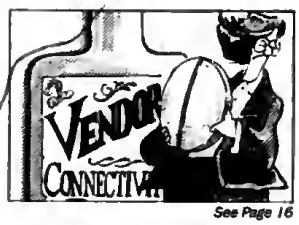

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ILLUSTRATIONS ON PAGES ONE AND 17 BY ALAN WITSCHONKE

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Massively parallel processor introduced

Connection Machine concept represents a 'new technology'

By Eddy Goldberg

CAMBRIDGE, Mass. — The massively parallel processing Connection Machine introduced by Thinking Machines Corp. last week represents "a fundamentally new technology," according to company founder and President Sheryl Handler.

The Connection Machine incorporates 16,000 to 64,000 processors that reportedly process data at up to 1 billion instructions per second.

"I think it's a breakthrough, but I don't think it immediately makes other machines obsolete," said Vincent E. Giuliano, vice-president and chief scientist at Mirror Systems, Inc., which produces software systems for parent company Times Mirror Co.

"The important thing at this point is to prove the concept," said Martin Schultz, chairman of Yale University's computer science department. "We have to find out if massive parallelism is the answer to our needs," he said. Schultz is looking to simulate three-dimensional physical experiments, among other tasks.

The company, founded in June 1983, has sold six units, which cost $1 million in the 16,000-processor configuration and $3 million for the full 64,000-processor version.

The first sale was to the Defense Advanced Research Projects Agency (DARPA), which sponsored the project to develop a general-purpose massively parallel computer.

"Each of the architectures we're sponsoring represents a major architectural advance," said Stephen Squires, assistant director of DARPA's Information Processing Technology Office. "This is pushing things in the direction of fine-grained, massively parallel, fully connected computing," he added.

Fine-grained processing assigns each data element of a task to an individual processor, allowing thousands of processors to work simultaneously, the company said. It works best where the number of data elements is large, ranging from 10,000 to one million.

The front end is a conventional computer, such as a Digital Equipment Corp. VAX or a Symbolics, Inc. 3600, which contains the programs. Any single-data-element instructions are executed directly by the front end. Instructions that call for operations on the whole data set at once are passed to the Connection Machine for execution.

For problems with more than 16,000 or 64,000 data elements, the processors, which each have 4,096 bits of memory, act as virtual processors. The Connection Machine can support up to one million virtual processors.

Its communications technology, called the router, has an overall capacity of 3 billion bit/sec. and allows any processor to establish a link to any other processor in a maximum of 12 dynamically configurable steps. Though its future usefulness is yet to be fully determined, four applications were demonstrated: document retrieval, fluid dynamics modeling, creating contour maps from aerial photographs and the design of very large-scale integrated circuits.

Rolm voice linked to VM

From page 1

"This is the first link between voice messaging from Rolm and an IBM office system," said Jeff Crow, group product manager of Rolm's messaging products division. "We believe that voice and text mail are complementary; bringing them together benefits users."

One such benefit, Crow said, is that Profs users will receive notification of waiting Phonemail messages directly on their screens. They can also bring up a list of waiting calls that includes details such as caller name and time of day.

"The actual features being provided are less important than the fact that this announcement represents a first, small but important step toward true integration of Rolm voice and IBM data systems," said Susan Lehto, senior research analyst at Boston-based consulting firm the Yankee Group.

"You wouldn't want to rush out and buy this stuff unless you already had most of the necessary components," Lehto added. Those components, she said, include IBM's VM/SP Release 3; IBM's Voice Text Messaging System (VTMS), which is priced at approximately $10,000; a Phonemail system, which costs $40,000 or more; and Voicemail/VM, which is priced at $2,000 and up. VTMS can be used as a text messaging system or as part of the link between Phonemail and Profs.

"Dual message notification is a small feature," Lehto said. "The next step would be having voice messages delivered to the user's terminal, either on the screen or in printed form or even audibly."

Available now, Phonemail/VM is said to run on any private branch exchange or Centrex system supported by Phonemail. It costs $2,000 for a four-channel PBX, $4,000 for an eight-channel PBX, $6,000 for 16 channels and $2,000 for each additional add-on of 16 channels.

A second Rolm introduction was the latest release of Phonemail, which includes a number of new features, including the following:

- Name/extension identification, which enables users to identify a message recipient by last name instead of by extension.
- Multiple personal greetings, which allows users to set up two alternate messages for callers. For example, internal callers might hear one message, callers from outside, another. This feature is only available with Rolm CBXs.
- Personal distribution list, which sets up one number to send voice mail to a group of Phonemail boxes. Abbreviated prompts allow experienced users to use shorter versions of Phonemail commands.

The new version of Phonemail is automatically included with all new Rolm voice messaging systems, as of today. It also is available as an upgrade to currently installed systems. The upgrade is priced the same as Phonemail/VM.

Second-class postage paid at Framingham, Mass., and additional mailing offices.

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TOP OF THE NEWS

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the entire vendor exposition, and moved the remaining educational conference to a much smaller site.

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A small computer platform and an office networking software system are due to be announced by Honeywell early next month. Top Honeywell executives are scheduled to be on hand in New York as the company emphasizes its commitment to the office market and outlines its strategy for the office and departmental systems arena.

■

Software Publishing Corp. will announce today it has signed a letter of intent to acquire a full-function desktop publishing product being developed by Best Info.

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Computervision launches flagship CAD/CAE Caddstation

Firm has no plans to sell Cadd 4X software alone

By Rosemary Hamilton

BEDFORD, Mass. — Aiming for a new lease on life after a year of declining market share, Computervision Corp. last week rolled out a workstation-based computer-aided design (CAD) and computer-aided engineering (CAE) system slated to become the firm's flagship product.

But while the new Caddstation won positive initial reviews, some observers questioned the company's strategy of not making its proprietary software available on a wide range of other vendors' hardware.

Meanwhile, Computervision posted improved financial results for the first quarter ended March 31 that showed the company still operating at a loss. Computervision reported a net loss of $7 million, or 24 cents per share, on revenue of $112.9 million. In the first quarter last year, the company reported a net loss of $18.8 million, or 66 cents per share, on revenue of $105.9 million.

Caddstation will be sold as a complete system, and Computervision does not plan to sell unbundled Cadds 4X software to non-Computervision workstation users as some analysts have urged.

Furthermore, a company spokesman said that even if Cadds 4X were supplied to non-Computervision users, it would not work well without the Computervision-designed Graphics Processing Unit (GPU) that was incorporated into the Sun Microsystems, Inc. hardware used to build Caddstation.

"It wouldn't be as powerful or as integrated without the GPU," spokesman Thomas Charland said.

"This is a real sticky point," said Vicki Brown, a senior analyst at International Data Corp. in Framingham, Mass. "By not unbundling the software, they've yielded a product by which the software can only run on Computervision systems."

Large number of Cadds 4X devotees

However, Computervision has a large installed base of Cadds 4X devotees who are willing to buy complete systems, analysts predicted.

"A good portion of the installed base will buy Caddstation," said Laura Conigliaro, a vice-president at Prudential Bache Securities, Inc. in New York. "They continue to buy the older systems with Cadds on them."

Dana Lonn, CAE manager at lawn equipment manufacturer Toro Co. in Minneapolis, said his department was a beta site for Caddstation. "Generally, it's a very good system," he said. "It needs a little development work to get it where it should be, but I'm convinced they're committed to do that."

Lonn said the response time on his 8M-byte color workstation is not as quick as he expected, particularly when he is working with the accompanying tablet to input data.

Caddstation is based on a Sun 32-bit workstation operating under the University of California at Berkeley 4.2 version of the Unix operating system. It comes with either a Motorola, Inc. 68010 or 68020 microprocessor, a 68881 floating-point processor and the proprietary GPU graphics coprocessor.

The stand-alone version comes with 4M bytes of main memory, expandable to 12M bytes and 85M bytes of disk storage, with the option of adding another 85M-byte disk. Users can purchase either a monochrome monitor or 1,152- by 900-pixel, 19-in. color monitor.

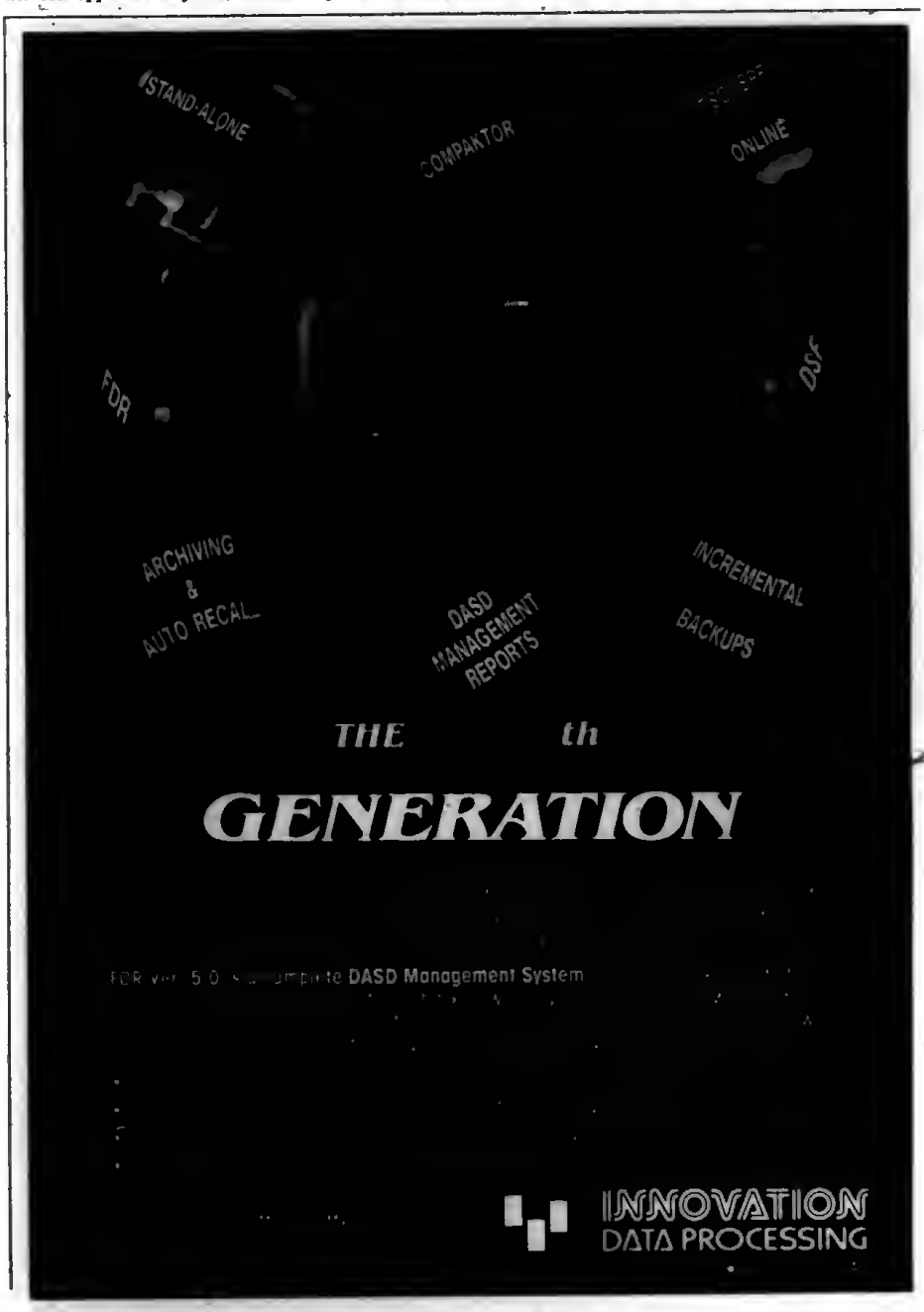
The system can also be used as either a diskless node or a file server on a network and can be configured as a host for up to six Caddstations. Computervision officials refused to release specific prices but estimated that a typical color Caddstation, running its mechanical CAD software, will cost approximately $65,000 and that a diskless node will sell for about $14,000.

Computervision also announced the Caddsnetwork, an Ethernet-based network supporting the Transmission Control Protocol/Internet Protocol (TCP/IP), that will provide Caddstation access to both Digital Equipment Corp. and IBM systems that support the protocol as well as older Computervision systems such as its CDS-4000.

The first portion of the Caddsnetwork will be a local-area network to link Caddstations with the Sun Microsystems Network File System, which allows users to transfer data among different systems. The company said a backbone network supporting the TCP/IP protocol will be available this summer.

Caddstation is the result of a three-year effort in which the company ported its Cadds 4X computer-aided design and manufacturing (CAD/CAM) software from its proprietary systems to one based on an industry standard platform. Some of the company's troubles last year resulted from its proprietary systems losing market appeal.

"It can't help but be a boost," said Charles Foundyller, president of Daratech, Inc., a CAD/CAM market research firm in Cambridge, Mass. "The installed base will be very happy with it. It's attractive-looking and has good user interfaces."



Speed, small memory among few criticisms of NCR 9800

Users generally pleased with fault-tolerant effort

By Jeffry Beeler

PHOENIX — Some potential buyers of NCR Corp.'s just-announced Model 9800 mainframe last week characterized the machine as too slow to satisfy even their current, much less their future, processing needs.

At least a few user complaints were also triggered by the 9800's failure to expand NCR's memory address space beyond its current 8M-byte limit.

Otherwise, though, NCR's first venture into fault tolerance and online transaction processing won generally rave reviews from members of the International Federation of NCR User Groups. The members were in town last week for the 16th annual NCR Users Conference (Nucon), which marked the 9800's first public demonstration since its introduction April 22.

"I'm quite excited about the product's fault-tolerant features, which are fantastic and signal a whole new direction for NCR," said Lawrence Staples, programming vice-president at Appleton, Wis.-based Valley Systems, Inc.

Although the 9800 uses a significantly enhanced version of the operating system that drives NCR's previous mainframes, most users foresee little hardship in porting their existing files and application code to the company's fault-tolerant architecture.

"Migration path engineering is one of NCR's traditional strengths," Staples said. "Users may not always get the performance they want when they move their software from one generation of NCR system to the next. But at least the programs always continue to run."

A similar faith in the vendor's migration prowess was voiced by Homer Schmitz, senior vice-president for management resources at St. Louis-based Deaconess Hospital. "Over the years, we've gone through several generations of NCR hardware," Schmitz recalled. "Every time we upgraded to a new processor model, we had a pure transport of software."

Baker Manufacturing Co. of Evansville, Wis., is also a seasoned veteran of NCR mainframe swapping. "In 1971, we started with a Century 100," explained Baker's MIS manager, Robert Richter. "Later, we became one of the first 50 users of NCR's Criterion 8550." In the end, Baker upgraded to an 8560 and then to an 8575 Group 2, which the company still uses.

His company's earlier successes in graduating to new, enhanced mainframes has convinced him that code residing on existing NCR systems can be ported to the 9800 with little rewriting. "But to get the full benefit of the machine's native performance, the software will have to be recompiled," he said.

User reaction not all upbeat

Reaction to the latest NCR mainframe announcement, however, was far from universally upbeat. Staples of Valley Systems, for example, found fault with the computing horsepower of the 9800's application processors, each of which roughly equals the performance of an NCR 8555 Group 2.

Staples expects the company to increase its fault-tolerant machine's processing speed through the addition of improved technology. But until then, the 9800's current throughput "simply won't be adequate for my work load," he said.

Cincom facing relational test

From page 1

matched or bested IBM's market-leading DB2 product on most of the 12 points in Codd's controversial relational quality scale (CW, October 14, 21, 1985).

The initial MVS version of Supra, announced last fall, has been available since Feb. 17. A DOS version will be available June 1. The new release of Mantis, 4.2, was announced and will also be available June 1.

Speaking at the Cincom meeting was Codd's associate C. J. Date, a partner in the Research Institute, who cited three specific points on which his group considered Supra to be superior to DB2. These were referential integrity, primary keys and foreign keys.

Date criticized the lack of referential integrity in DB2, while calling it "one of the strongest points about Supra."

Referential integrity is a relational property that allows the system to enforce rules on whether one set of data can be used with another. "We have a rule you cannot enroll a student who has not been admitted," noted J. Rich Burnett, data base administrator for Alabama's Auburn University. Auburn is one of a handful of early users of Supra, and Burnett said, "referential integrity is built into the system. It will enforce those rules."

Date said referential integrity can be added to DB2 on an application-by-application basis, but it is a job for a skilled programmer. The other points Date mentioned were primary keys, which identify records and represent fields within those records, and foreign keys, which tie one record to another through its primary key.

The full preliminary results of the Codd study were not made generally available, but were related to users. "Supra appeared higher on each count than DB2," recounted Ray Parham, data base administrator of Akzo America, Inc., an Asheville, N.C., holding company, who attended a closed-door briefing on the study by Cincom officials.

Other sources tempered claims that Supra was being rated higher on many counts, saying Supra's alleged superiority was limited to one or two areas. A McDonnell Douglas Corp. representative said, "It's the tools tied to Supra that make it look better. I don't think it's a lot better."

Nevertheless, Cincom customers were eager to see final results of the study. It is scheduled to be published sometime this summer, Cincom officials said.

"I think Supra has got a great architecture," said Neal Indermuhle, data base administrator for J. M. Smucker Co., the Orrville, Ohio, food processor, who said he would like to see his firm move from Supra's predecessor, Cincom's TIS data management system, to the new system.

A Frankfurt engineering firm, Lurgi, has installed Supra and conducted tests with it for four weeks to compare its performance with DB2 and IBM's IMS. Andreas Ohuserge, Lurgi director of data base implementation, said in one instance an application designed to take advantage of relational properties ran 1.7 times faster on Supra than on the IMS version. He cautioned that the test reflected "special circumstances" and was not a head-to-head comparison.

A powerful one-two punch

Conference attendees said a new release of Mantis, Cincom's fourth-generation development language, coming at the same time that Supra hits the marketplace, will give the firm a powerful one-two punch.

Release 4.2 features screens that are 255 col. by 255 rows, compared with the 80-col. by 24-row limitation in the previous release and that offer full screen editing, compared with single-line text editing in the previous release.

Many attendees worried over how much both new products would draw down their mainframe resources.

John F. McKeown, telecommunications programmer for Signode Industries, Inc. of Glenville, Ill., said he had been told by Cincom officials that the new release of Mantis increased CPU demand by 30% but the increase could be trimmed through high-performance options that would improve performance 24%.

The options include binding and global pools. Binding allows a Mantis program to hold more information about what it has just done in the mainframe random-access memory (RAM), saving disk access time. Global pools is the name of a tracking system that watches what common routines are resident in memory at the same time. When a production application calls for a particular routine, the CPU retrieves it from another application in RAM rather than from the disk.

Without the high-performance options, Release 4.2 "will probably run a little slower," said Thomas McLean, Cincom's vice-president for marketing and product planning.

Mantis 4.2 will go to current users as a free upgrade and will be sold to new customers for $30,000 to $80,000. When purchased together, the DOS version of Supra and Mantis will sell for $193,000 and the MVS version for $274,000.

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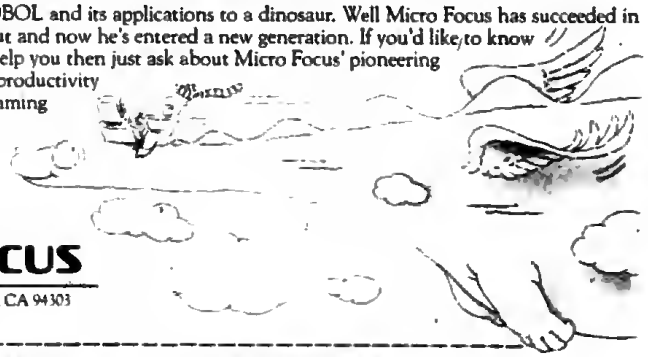

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Resellers strengthen ties with customers

Toshiba transportable, optimism of business chains highlight Comdex

By Eric Bender

ATLANTA — Despite tumult in the micro reseller channel and predictions of a vendor shift toward direct sales, major computer chains are solidifying their position among corporate customers. This was the consensus of both vendors and resellers interviewed at last week's Comdex/Spring '86 trade show.

While Lotus Development Corp. continues to beta-test various distribution options for large customers — including electronic distribution, on-site copying and others — "many of the reseller channels have rationalized to the point where they can handle that distribution more cost effectively, in many cases, than the customer or Lotus," Marketing Vice-President Michael Kolowich told *Computerworld*.

"Many large customers are sort of unraveling some of their PC support efforts," commented Alan Hald, chairman of Microage Computer Stores, Inc., a franchise operation with almost 170 outlets. "They only do those efforts from necessity."

"Customers say, 'We've been spending the last two years trying to get out of that business,' " Kolowich agreed.

Surviving dealer chains will be strengthened by their ability to draw on additional financing, suggested Rod Canion, president of Compaq Computer Corp., at a Comdex press conference. "The consolidation continues, but there are not any significant dealers shaking out," Canion said.

That was the good news for resellers and perhaps for their corporate customers at the annual spring edition of Comdex.

Decline in exuberance

The show exemplified the general decline in exuberance of micro-focused trade shows. While attendance held steady with previous years' spring gatherings at about 40,000, there were very few splashy receptions and no dramatic product announcements.

In software, desktop publishing and computer-aided design packages drew considerable attention. Among more general-purpose offerings, Satellite Software International introduced the Word Perfect Library, a $129 program manager for the firm's word processing software with built-in program editor and macro facilities. General Optimization, Inc. announced What's Best Personal Version, a $149 entry-level variant of its linear programming add-on package for Lotus' 1-2-3 and Symphony.

Local-area networks were a topic of much discussion, but few network-tailored applications debuted. One of the holdups, according to 3Com Corp. Chairman Robert Metcalfe, is difficulty in resolving pricing issues. 3Com and other vendors joined in a recent study of those issues. The study reached no overall conclusions but indicated that pricing on a per-network-server basis appeals most broadly, Metcalfe said.

If there was a hot system introduction at Comdex/Spring, it was Toshiba America, Inc.'s transportable micro, an IBM Personal Computer AT-compatible system that weighs 16 pounds and carries a starting price of $4,499. The externally powered T3100 features 640K bytes of internal storage, one 3½-in. floppy disk drive and a 10M-byte hard disk drive. Toshiba targets the machine against Compaq's new Portable II.

The expected flood of AT-compatible systems did arrive. So did dozens of add-in cards, "which can be noted here in their volume and perhaps in their lack of distinguishing characteristics," commented William Coggshall, industry analyst with Market Access international, Inc.

Among peripherals, about a dozen laser printers were unveiled (see story page 22), along with an offbeat package from Eastman Kodak Co.'s Sayett Technology subsidiary that permits PC screen images to be displayed with standard overhead projectors. The $1,200 system combines controller hardware and software with an LCD panel that sits on the projector's lens and produces a high-resolution monochrome image.

While there was much talk about future systems based on the Intel Corp. 80386 chip, the first significant product introductions are not expected before Comdex/Fall '86 in November, at the earliest.

Apple Computer, Inc. skipped the show again, and its Macintosh was almost as invisible as 80386-based hardware.

As usual, various conflicting trends showed up in hardware and software pricing. Corporate Software, Inc. Chairman Morton Rosenthal predicted that the street price of both Lotus and Ashton-Tate products will climb, as those vendors have boosted pricing to resellers. System costs showed steady slippage, with a prime example being one IBM-compatible system carrying a $345 price tag (with some lengthy footnotes).

Consolidatioo trends also showed up in service firms, with the demise of McGraw-Hill, Inc.'s market researcher, Future Computing, Inc., the most spectacular case.

Contributing to this report were staff members Douglas Barney, David Bright, Stanley Gibson, James A. Martin, Peggy Watt and Clinton Wilder.

Problems delay 'Year of the local-area net'

By Peggy Watt

ATLANTA — Personal computers are still sneaking in corporate back doors, causing piecemeal configurations that help delay the "year of the local-area network" that industry watchers have predicted for the past several years, Zenith Data Systems Corp. President Robert Dilworth said last week during his keynote address at Comdex/Spring '86.

Robert Dilworth

The other major cause for local-area networks' delay is an innate childhood characteristic, Dilworth said in his opening address: "We do not like to share our toys.

"The user has had considerable flexibility up until now," he said in a later interview. "Maybe the only time we share our toys is when Dad says we have to. The MIS director is saying, 'yes, it's time to share.' "

That approach accompanies mandates being put from the top, Dilworth added.

"Many times, before a company has time to establish a standard, there are dozens of PCs, and sometimes more, around," he said. "Some of them are compatible, with much power, and some of them are not."

[illegible] also said that the most visible in the laptop market, one of Japan's primary areas, will be this year, when Zenith's recent introduction [illegible] laptop PC [illegible] there.

"I [illegible] even IBM could [illegible] compatible shortly," he said.

For [illegible] networking [illegible] shortly, Dilworth added, "there are many [illegible] because the [illegible] is aimed in the knowledge that the [illegible] systems will grow.

For vendors, he advised cooperation, a [illegible] undertaken in the [illegible] government [illegible] with [illegible] military contracts [illegible] from [illegible] other [illegible] dynamic [illegible] power, [illegible]

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NEWS

NAS unveils 7380 models

Can be field-upgraded to double-density versions

By James Connolly

MOUNTAIN VIEW, Calif. — Responding to what the company said was user demand for a phased upgrade path, National Advanced Systems Corp. (NAS) last week introduced new versions of its single-density 7380 disk drive.

The two 2.5G-byte drives, the 7380 Models AD and BD, can be field-upgraded to the double-density 7380 Models AE and BE (see story page 43) and can be used on the same strings as those E model versions. The previous single-density versions, the 7380 Models A4 and B4, cannot be upgraded or used in a string of D or E models but can be used with the same 7880-3 and 7880-3C controllers as the new models.

An NAS executive said the company had chosen to announce the dual-density drives without an upgrade in March 1985 because officials felt that replacing entire strings of single-density drives with double-density drives provided customers with more financial benefits and assured data integrity.

"But what the marketplace said it wanted was upgradable devices. In some cases it had to do with the Investment Tax Credit, and in some cases it had to do with the federal government saying that once they got a serial number on their books, they wanted to keep it," said Ken Page, director of peripherals marketing for NAS. He said NAS' large customers were the ones demanding upgradability.

Drives remain available

The standard A4 and B4 drives will remain available, particularly for users who want to fill out strings that already use those models and for customers who will not need a double-capacity drive during the next several years.

The AD and BD units contain dual-port electronics and four single-rotary actuator, head-disk assemblies, with each assembly accessing 630M bytes of storage. The AD costs $84,350, and the BD costs $61,225. A field upgrade from a D model to an E model drive costs $41,480. The D models, although formally announced last week, began shipments to customers in March and are available for volume deliveries now.

NAS also announced what it called its Gigabyte Discount Program, under which volume discounts for 7380 equipment will be based on the total storage capacity ordered. In the past, NAS assigned volume discount percentages to specific models. The Gigabyte Discount Program allows 8% discounts for orders of 20G to 49G bytes and 14% for orders in the 50G- to 99G-byte range.

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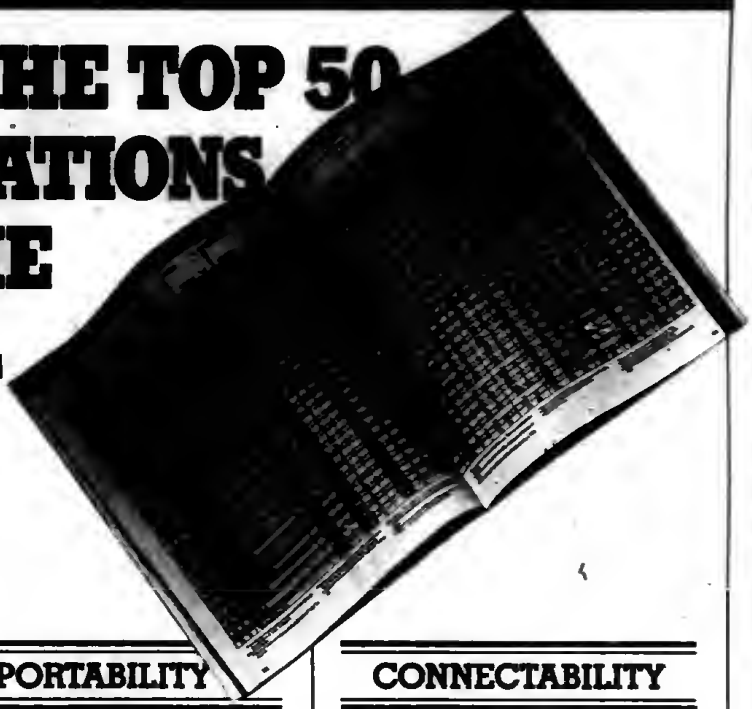

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Sacramento ..... May 13
San Diego ..... Jun 17, Aug 7
San Francisco ..... Jun 19, Aug 5
Sunnyvale ..... Jun 10, Jul 8, Aug 7
CO Denver ..... Jun 17, Jul 17
CT Hartford ..... Jul 16
New Haven ..... Aug 20
FL Jacksonville ..... Aug 5
Tampa ..... Aug 6
GA Atlanta ..... Jul 15
IA Des Moines ..... Jun 25, Aug 27
ID Boise ..... Jul 31
IL Chicago ..... Jun 12, Jul 8, Aug 14
IN Indianapolis ..... Jun 17, Aug 19
KY Louisville ..... Aug 7
LA New Orleans ..... May 21, Jul 11
MA Boston ..... May 13, Jun 19, Jul 16
Burlington ..... Aug 12
MD Bethesda ..... May 7, Jun 12
Jul 9, 23, Aug 7
ME Bangor ..... Jul 3
MI Detroit ..... Jun 10
Grand Rapids ..... Jun 13
MN Minneapolis ..... Jun 26, Jul 22
MO St Louis ..... May 14, Jun 11, Jul 30
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UT Salt Lake City ..... Jun 5, Aug 6
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Halifax ..... Aug 20
Montreal ..... May 14, Jun 18
Ottawa May 8, Jun 12, Jul 10, Aug 14
Quebec ..... Jun 18
Toronto ..... May 6, Jun 3, Jul 1, Aug 5
Vancouver ..... Jul 10
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Fast-food firm orders ISDN

From page 1

increasing cost of providing new terminal connections and moving equipment on Centrex. "And we wanted greater control and management of our communications system," he adds. "The phone company had been doing all of our reconfiguration and testing."

Consequently, two years ago, managers of McDonald's information systems, telecommunications and office automation came up with an 800-item manifesto describing current and future voice and data communications needs and sent out a request for a proposal embodying these details.

One of the nine companies to respond was McDonald's current Centrex-based service vendor, Illinois Bell, which offered a telecommunications solution based on the emerging ISDN networking standard.

ISDN proposal best bet

The McDonald's management team decided Illinois Bell's central office-based ISDN proposal best met the company's technical, support and financial criteria, Krause says.

"It was a perfect fit," recalls Paul Czaplewski, manager of marketing product management with Illinois Bell. "We had recently been designated by AT&T and Bell Communications Research, Inc. to be the first trial provider of ISDN on AT&T's Number 5 Electronic Switching System digital switch. We were looking for a business to be the first trial site when McDonald's called."

The team of managers "decided that we need integrated voice and data over uniform wiring, as well as store-and-forward information distribution and voice messaging," Krause says.

"McDonald's is a communications-intensive company; our people are rarely at their desks. We wanted a way to combat the telephone-tag problem by enabling our employees to access messages when they want to. And management stepped in and demanded a long-term, strategic telecommunications solution," Krause remarks.

"We chose ISDN because it offers us a blueprint for orderly evolution as new technologies become available; it doesn't limit us to one set of products," Krause says.

The company will be able to use 95% of its current wiring with the new ISDN communications system and replace the current analog system "one phone set at a time," Krause adds.

Illinois Bell currently estimates that the price of putting a terminal on the ISDN system will be "competitive with the $1,000 to $1,200 average cost of putting a terminal on a Rolm Corp. or Intecom, Inc. digital private branch exchange," according to Krause.

ISDN services provided by the telephone company will cost approximately twice the current price of Centrex lines, he says. "Those estimates incorporate savings based on shared use of interfaces," Krause notes.

Illinois Bell's ISDN services will be compatible with the old Centrex system, according to Czaplewski. "McDonald's will start with a small number of 2B + D ISDN lines initially and convert more Centrex analog lines to ISDN as needed." 2B + D is the basic ISDN rate defining two 64K bit/sec. "B" channels and one 16K bit/sec. "D" channel, which is used for packetized data and signaling.

The McDonald's trial tests only basic ISDN communications services, defined by layers one through three of the ISO model, Czaplewski notes.

For now, Illinois Bell and McDonald's are concentrating on setting up an ISDN system that can deliver voice, data, text or image transmissions to a user's desktop terminal over the same 64K bit/sec. channel.

Illinois Bell currently has out a request for proposal

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specifying a terminal adaptor that will enable a desktop device to be compatible with McDonald's current equipment base and with ISDN interface specifications.

The first step involves minimizing duplication of resources, administrative overhead and local distribution costs, Krause says. For example, coaxial-attached devices can be multiplexed over a circuit- or packet-switched connection over one or two aggregated 64K bit/sec. B channels. This would eliminate the need for coaxial cable connections.

Eventually, McDonald's plans to use Illinois Bell's digital switch to interface a wide variety of on-premises devices with a range of outside services, such as telephone sets with WATS, public dial-up and T1 lines; personal computers, 3270 terminals and integrated voice/data terminals with remote hosts; and long-distance network services.

The primary trial is scheduled to begin in October at McDonald's Oak Brook, Ill., headquarters. "We'll start with a limited number of ISDN lines, ramping up to 300 to 400 by early 1987," Krause says. A full trial at headquarters should be underway by mid-1987.

If all goes well, the company plans to implement ISDN at its 30 field offices as services become available from other telephone companies.

McDonald's could have installed ISDN switches on its own facilities, but the company chose Illinois Bell's central office-based solution because, "we preferred not to operate and maintain the telephone system on a daily basis, although we did want to manage it," Krause says.

Services not yet offered

Most of the ISDN services that McDonald's will be using during the trial are not yet offered commercially by Illinois Bell. McDonald's also will have to wait for some of the services, such as the option of aggregating 64K bit/sec. channels to provide higher transmission rates.

Currently, Illinois Bell's digital switch only handles 64K bit/sec. channels. "Right now, we would have to do the aggregation on our premises equipment and also provide synchronization," Krause says. This would involve more in-house resources than the corporation currently is willing to expend.

Krause recognizes, however, that "ISDN is not all here today, its issues are not all nailed down." Some issues relate to McDonald's need for a multivendor environment.

"We like to pick and choose our suppliers; the trial involves five or six at least. There has to be an end to finger pointing; vendors have to assume end-to-end responsibility beyond the line where their technical responsibility ends. And we still need multivendor conformance to the standard."

He also points to internal organizational issues that will arise at McDonald's and other companies converting to ISDN. "Most organizations have their voice and data groups separate; those have to be integrated to provide user support.

Multivendor network management products are "still on vendors' drawing boards, and I don't think a global network management interface will happen in the near future," Krause adds. McDonald's will probably implement two or three network control points, each utilizing a different vendor's product, he predicts.

"A lot of work needs to be done in the next year or two," Krause concludes.

McDonald's ISDN goals

McDonald's Corp.'s long-term goals for the Integrated Services Digital Network (ISDN) trial include the following:

- **Reduction of costs associated with wiring changes and additions, network access and terminal equipment.**
- **Increase of productivity by providing employees with store-and-forward messaging and with integrated voice/data systems.**
- **Service-level improvement, by cutting lead times for new equipment and, through the higher speeds, increased accuracy and decreased downtime associated with an end-to-end digital network.**

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Dexpo debuts draw users, but DEC policy draws grumbles

Components, software, Microvax II products highlight Dallas show

By Donna Raimondi

DALLAS — While third-party vendors grumbled about Digital Equipment Corp. decisions that cut many of them out of the new VAX products market, thousands of DEC users came to Dexpo South '86 last week looking for components and software.

Close to 7,000 attendees, many of them in town for the Spring Decus U.S. Symposium, pored over the products exhibited at Dexpo, where 200 companies showed more than 500 DEC-compatible products. About the only DEC-related company that was not there was DEC itself, which was running Decus simultaneously.

"DEC's shipment of most available Microvax II products to its very large system integrators is affecting our business in that the big companies that got the Microvax had to buy memory from DEC and not from the open market," said Jack Mueller, manager of memory products at Hamilton Standard Digital Systems, Inc., a memory board vendor. "It's a precondition in the DEC agreement that helps DEC control the market," he added.

Mueller said the difference in price to the customer can be significant — a $13,000 DEC-supplied Microvax II board would cost about $4,000 from a third-party vendor.

Vendors shut out

One Midwestern academic user, looking for add-on memory for his new VAX 8200, was out of luck. "DEC won't let vendors in any more. I will have to buy DEC add-on memory for three times more money and pay a maintenance fee for the rest of my life. DEC is playing hardball now Field service said if I put foreign memory on, DEC would not maintain the computer," the user said.

But attendees were, for the most part, finding what they were looking for at the exhibition. "I am absolutely pleased with the show," said Ellen Robie, chief of the data systems branch, Department of the Army at Fort Huachuca, Ariz. Robie came looking for relational data base management systems for DEC's VAX machines and left with a shopping bag full of pertinent material.

"I'm at Decus and Dexpo to see what new products there are for the Decsystem-20," said Stan Baer of Harvard University's Business School. DEC relieved his concerns at Decus by announcing that support for the Decsystems would continue until 1994. For the first time, there were no Decsystem-10 or -20 systems exhibited at Decus, "but they do have new products to use on them," he said. "I'm looking for some communications products, too," Baer said. The Harvard Business School is tying 2,000 IBM Personal Computers into the Decsystem-20.

"I'm trying to determine if the software we want to use has been put up on the RSTS/E [PDP-11 operating system]," said attendee Robert Brandt of the Appraisal Group real estate consultants in Dallas. "From the folks I talked to so far, there have been no major improvements in the software for RSTS/E. DEC is pushing VMS so hard that in most applications, it's desirable to move to VAX machines, but for our applications, because of the file structures and other things, RSTS is still more desirable," he said.

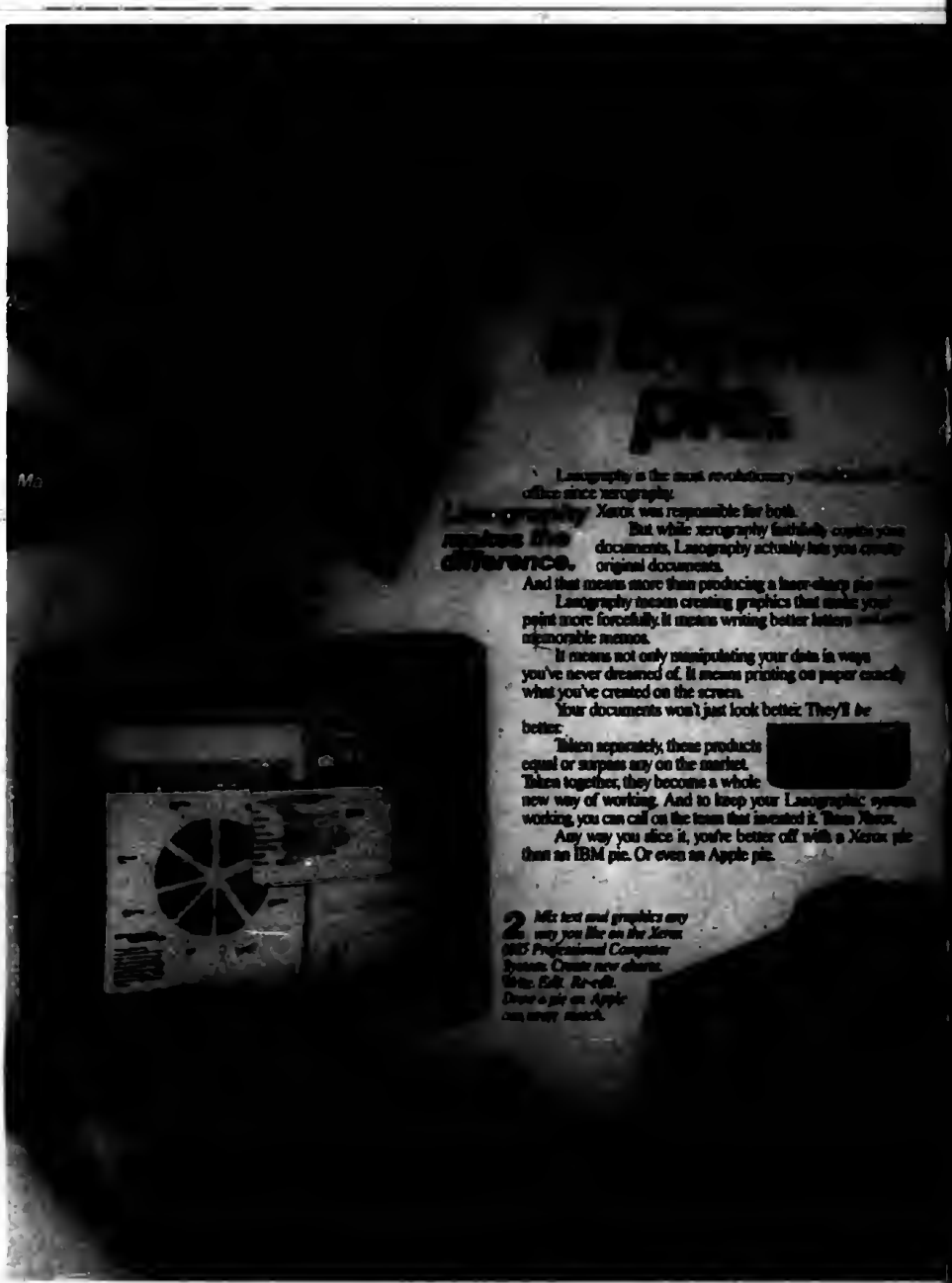
New products

Several new products were released at Dexpo. One of the most interesting ones, called a Unibus segment isolator/high-speed repeater, was designed by former DEC engineer Ernest DeFore, now vice-president of Setasi Research and Development in Fort Lauderdale, Fla. The unit, marketed by MRI Computers in Fort Lauderdale, replaces a DEC M920 or M9202 Unibus connector and is said to eliminate the need for additional $13,000 Unibuses as a configuration grows. One of the unit's beta-test site engineers said the $3,000 unit has been running in his installation for a month with no problems.

By far the largest number of products shown involved the DEC Microvax II supermicro. Roger Weidel, an Eastman Kodak Co. Microvax II systems manager, came to the show looking for Microvax II memory boards and for TK50 tape systems for the Microvax, which he said are in "real short supply." Weidel came to Dexpo from Decus, where he said that DEC was showing a model of clustered Microvax IIs.

The only DEC VAXBI-based product released at Dexpo was the ICP1632 intelligent communications processor from San Diego-based Simpact Computer Systems. The vendor said the processor will be generally available in September 1986.

Numerix Corp., based in Newton, Mass., announced that it signed an OEM agreement with DEC whereby Numerix will add its array processors to the Microvax II and VAX 8200 systems in order to create turnkey data acquisition systems for use in laboratory and workstation environments.



Strategic investments in automation add up, professors say

Accounting methods quantify potential gains

By David A. Ludlum

BOSTON — Conventional accounting fails to reflect all the benefits of automation and can discourage companies from making valuable investments, two business professors told a national gathering of accountants last week.

Accounting methods should be adapted to realize the gains automation can provide through manufacturing flexibility and product quality, said Grant W. Russell, professor of accounting at Canada's University of Waterloo, and David M. Dilts, professor of operations management at Michigan State University.

The two brought their message to a conference on "Cost Accounting for the '90s" sponsored by the National Association of Accountants. They discussed investments in factory automation, but Dilts told *Computerworld* that their approach also applies to analysis of office automation and information systems. "We need to look at the strategic implications of those investments, too," he said.

Traditional criteria for judging business investments — the rate of return, payback period and cash flow, for example — work for tactical moves, Dilts said. But in their current forms, which focus chiefly on cutting costs, they might fail to recognize all the benefits of strategic investments, he said. "We have not been equipped to handle major changes in our manufacturing process," Dilts said.

Many of the corporate investments in factory automation to date have been undertaken as experiments because of customers' requirements or from "a basic faith in automation," Dilts said. Such faith does not specify the best approach to automation or point out situations where it is not desirable, he said.

But accounting can be used to quantify the potential gains from investments in automation, the professors said. Taking turns at the podium in tag-team fashion, they outlined several general sources of gain that accountants must learn to account for more effectively. They include the following:

- Manufacturing flexibility, which can speed up changes in product design, production level, the manufacturing process, replacement of products and introduction of new products. "How much is that timing worth to us?" Dilts asked.
- Improvements in product quality through the elimination of random errors that crop up in labor-intensive manufacturing.
- Synergistic benefits to other operations, such as accounting and personnel, through information generated by automation systems.

Dilts said marketing executives have been the most successful in quantifying the impact of manufacturing flexibility and product quality on conventional accounting measures such as return on investment.

DEC unveils workstation

By Rosemary Hamilton

MAYNARD, Mass. — Digital Equipment Corp. last week added a low-cost, scaled-down monochrome model to its Vaxstation family of engineering workstations and cut the price of two other monochrome workstations.

The company also announced an upgrade package that moves its Microvax II or Vaxstation II systems to the Vaxstation II/GPX, the workstation line it introduced earlier this year.

The Vaxstation II/Restricted Configuration (RC), which is currently available, is based on the Microvax II processor and is offered as two, fixed-package, nonexpandable systems. A 3M-byte version costs $14,995, and a 5M-byte version costs $16,995.

DEC reduced the price of two monochrome Vaxstation II systems by an average of 15%. The $29,600 Vaxstation II now costs $26,000, and the $36,800 version now costs $30,500.

The Vaxstation II/RC was designed for such applications as technical publishing that require minimal memory, whereas other monochrome models in the Vaxstation family are suited for more sophisticated applications such as the development of artificial intelligence tools and systems, a spokesman said.

The Vaxstation II/RC operates under both Ultrix, the vendor's version of Unix, and MicroVMS. The system comes with a 19-in. monochrome monitor, a 71M-byte disk, disk controller, Ethernet interface, 95M-byte streaming tape drive, video subsystem, standard keyboard and mouse.

The upgrade package, scheduled for June release, would allow users of the Microvax II or Vaxstation II to upgrade to the GPX line. Prices will start at $7,050. The company said its VMS operating system for the GPX line will also be released at that time.

VIEWPOINT

EDITORIAL

Hang the user: Vendor vs. pirate

Software piracy is back in the news, with all the drama of a segment of *Miami Vice*. In Hong Kong, police raided a shopping arcade notorious for its sales of pirated goods, netting 17 arrests and $130,000 in stolen software — all thanks to the investigative legwork of Lotus Development Corp. In Toronto an entrepreneur faces 10 counts of criminal behavior for boldly advertising and selling at bargain-basement rates software he copied from a variety of vendors. And, in sunny California, a computer reseller was accused by Ashton-Tate of copying software onto 20M-byte hard disks, which he then sold to users as add-on products.

Because these cases are dramatic, they may be pointed to by vendors and their lobbying groups as an argument for copy protection devices and other unwieldy restrictions on all those who buy and use software products. This would be unfortunate. There is simply no fair comparison between such examples of clear criminal conduct and the legitimate demands of corporate buyers for reasonable agreements on duplicating software within their organizations.

Along some fronts on the anticopying battleground, some software vendors are spending time, energy and legal fees tracking down those few criminals who deserve to be dubbed pirates. But it is far more productive for vendors to spend time, energy and dollars designing better software duplication agreements for that far larger and far more important body of software buyers who inhabit corporate offices.

Notes & observations

A recent thought from Chairman Malcolm (as in the editor in chief of *Forbes* magazine), titled "The Computer Age is Only at Dawn's Early Light":

"There's irony in the fact that early death has come to so many spectacular corporate denizens of America's silicon valleys. There's irony in the fact that malaise still plagues the huskier players plowing our silicon fields.

"We've really only opened the door to the Computer Age. Even the wildest or soundest or most soaring imaginations can't predict, foresee, conjure up the dimensions, the ramifications, the impact that lie ahead.

"The transfigurations (pardon the pun) to come from compacting research on computers in health, in mind, in body, in not-yet-born and the analysis and prescribing for the sick are far out — and some still far off.

"From weather to design, travel safety to embracing knowledge of space, for research in every area, computer use is only at the threshold.

"There is no aspect of your daily life and your doings or anyone else's that is not or won't be immensely more affected at a geometrically accelerating pace.

"While this unimaginable Tomorrow won't happen tomorrow, the current bleak pause in the computer field is just that — a pause whose duration will be as varying as the uses, users, makers and visionaries involved."

LETTERS TO THE EDITOR

Misapplying the principle of privacy

Underlying the statement quoted in the editorial, "Computers aren't the issue" [CW, April 14] by Jerry Berman of the American Civil Liberties Union, is the premise that whether or not a government action violates our privacy depends on the power of the technology used. Berman misses the point, as your editorial argues; and the premise, which appears to be a consensus in his milieu, seriously harms the privacy cause and consequently everybody.

I do not recall that the ACLU has challenged the right of government to know who is delinquent in repaying student loans, receives welfare benefits, has taxable income or even is old enough for draft registration. It seems even to concede the right of the government to correlate the information but only in manual, special-case, generally ineffective ways.

To invoke the principle of privacy only when enough technology is applied to inconvenience a substantial number of violators discredits both the principle and, however unjustly, the motives of those who invoke it. If Berman thinks that file matching erodes privacy, then his vocabulary has a gaping hole where "privacy" used to be, to the detriment of what the word used to protect.

To be credible, the privacy advocates need to draw the line where there is a clear qualitative difference between what they do and do not deplore rather than at a point that appears arbitrary, capricious and even frivolous. If the castle walls about our truly private affairs are actually under siege, it is hardly the time to try to expand these walls by declaring private our business affairs and even our financial dealings with the government. This is a matter not only of elementary strategy but of perceived sincerity.

The Internal Revenue Service's objection (to matching information on tax returns with that on welfare rolls and delinquent student loan accounts) also deserves scrutiny. The mandatory notice in the instructions that accompany the federal tax return form explicitly warns that the information you provide can be disclosed to other government agencies.

Is it possible that the IRS is concerned less about violating a privileged relationship (which does not appear to exist really) with the taxpayers and deterring honest reporting of income than about diverting its resources to the aid of other government agencies to the detriment of its own work?

Nothing discredits a noble principle as effectively as misapplying, trivializing and exploiting it for ignoble ends. In this, Berman and the IRS seem to be political bedfellows, but perhaps not so strange.

Daniel J. Lasser
Rockville, Md.

Bug only part of software story

As much as we might enjoy the discomfort of Computer Associates International, Inc. per your article, "Repair of bug in Computer Associates tool hikes CICS bills" [CW, March 17], concerning its CA-JARS/CICS reporting system, we cannot help but be appalled at your unwarranted treatment of this subject. For some reason, you have singled out a rather modest niche product and a rather understandable, if embarrassing, bug.

I can assure you that software development is a humbling experience. No matter how hard you try, no matter how skilled you are, you will fall in some fashion. Inevitably, there is that situation where you can only shake your head and do the best you can. I know that. Other software vendors know that. And I'm sure CICS users know that. Does *Computerworld*?

If one of your 1,000 users complained, would you treat it similarly? Would you even consider the other 999? In this particular case, it seems as if you thought it newsworthy not that the error was fixed, not that the vendor discovered the error, not that the vendor had the courage to fix it, but that the error existed in the past.

Patrick H. McGettigan
President
Landmark Systems Corp.
Springfield, Va.

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VIEWPOINT

Departmental computing: PCs and mainframes not enough

Frustrated by its lack of success with the System/36 as a "strategic office automation" product, IBM has apparently been suggesting to some of its large customers that the proper approach to office automation isn't a terminal on a System/36, isn't a Personal Computer attached to a 36 or a local-area network but is rather a PC directly communing with an IBM mainframe.

Customers claim that IBM argues that the superior capabilities of its microcomputers make a new architecture possible, one in which the PC takes over many functions that would otherwise need to be based in an intermediate or departmental processor — true.

In addition, IBM claims that Personal Services/Personal Computer on the IBM mainframe offers adequate functionality for system-level functions such as electronic mail and file sharing, that building large office automation systems with departmental processors is too expensive and that this solution fits the overall IBM Systems Network Architecture environment better.

Now, what is going on here? This was supposed to be the year that all those thousands of personal computers in companies of every size started to get interconnected, some by local-area networks, file servers and software and some by departmental processors and office automation software. In fact, some companies are pretty far along this track, with vendors selected, plans in place, pilots under way and early reports of considerable success.

And the notion of the intermediate or departmental processor is an important part of this game if the following are true:

- The rush to personal computers was really (at least in part) a strong statement by end users that they wanted to control their own computing destiny.
- Departmental processors, departmentally controlled, are an extension of this perceived need for some end-user control.
- Those of us who struggle to provide a philosophical underpinning for what is going on are correct in identifying the inherent problems of trying to provide all of the systems-level functions, for every level of the organizational hierarchy, all at the mainframe level.

By AMY D. WOHL

No vice-presidents

To me, an office automation solution that is based only on workstations and mainframes is rather like a company with a president and staff, but no vice-presidents in the middle.

Who will provide coordination and control, corporate memory and experience, management and recommendation? Companies without vice-presidents don't work very well because every time two clerks have a disagreement on how to proceed, the president has to decide what to do. It's an appropriate structure for a very small firm in which the president makes all the decisions anyway. It is a terrible bottleneck for anything larger.

An end-user computing solution that is entirely mainframe- and PC-based assumes that end users can be adequately served by mainframe computers and the support apparatus they offer. I don't think that's likely.

Imagine a normal mainframe environment. It's Friday afternoon. There were two major software upgrades scheduled for this week and a new department full of 3270 Personal Computers to bring up with a new data base application. Everything is behind schedule (as usual), and you're scheduled to be down for 24 hours over the weekend for normal hardware maintenance and some new communication hookups.

The marketing vice-president's secretary calls to say the two of them are working on a report for the chief executive officer, and when she mails the draft back to him (via the mainframe, of course), all the underlines are disappearing. Immediate action is required.

Just finding out what's going on will be difficult. Is it a workstation problem? A communications snafu? A mainframe software (operating system, application, or whatever) problem? And who's going to do the problem determination and resolution in an already overworked environment? Or find a temporary rubber-band-and-band-aid solution?

And who says this is cheaper? Computer resource has to cost something. And baby-sitting big iron can cost substantially more because the job requires more skills than those of a departmental-level analyst or troubleshooter.

Organizational solution

In fact, since most of the cost of end-user computing is really in the support and training — and not in the hardware at all — perhaps we should look at this as an organizational problem and find an organizational (people and management) solution rather than expect the selection of hardware itself to offer profound answers.

The answer is really in the numbers. IBM numbers. System/36 is not doing well in the marketplace — not in the office automation market. Performance, even the improved performance of the newest models, still makes the system expensive and difficult to configure for large-scale installations. And System/36 OA software has never really become competitive with the best solutions of other vendors.

The IBM local-area network-based solutions aren't a real substitute yet

See PCs page 18

Wohl is president of Wohl Associates in Bala-Cynwyd, Pa., and editor of "The Wohl Report on End-User Computing" newsletter.

AT&T rides accelerating mobile data communications market

AT&T is about to get into the mobile data communications business.

That may not sound like much at first (in fact, AT&T is not even the first to do it), but as a new and emerging market, the potential is tremendous for end users as well as for vendors.

With direct mobile data, field service people can automatically access a computer like their office coworkers. Mobile data could, during the next few years, launch a whole new category of products and services: special applications software, ruggedized portable computers and terminals, special modems and other communications products like mobile satellite antennas.

Studying the market

AT&T and Basking Ridge, N.J. based Bell Atlantic Mobile Systems have been studying the market for data and private voice transmission services over cellular phone systems for almost a year.

They started by equipping about 50 Washington, D.C.-Baltimore-area cellular customers with special modems for encrypted voice and data transmission. Portable computers were supplied from Hewlett-Packard Co. and Data General Corp. to customers who needed them.

Months later, Bell Atlantic Mobile decided it was pleased with the initial results, but the decision to proceed was left to AT&T, which would have to produce the modems and special central office hardware.

AT&T decided to go ahead, despite the knowledge that, for the time being, the market is limited. Initially, AT&T and Bell Atlantic Mobile see mobile data as a very reliable voice encryption product. Ready markets are federal government agencies, government contractors and others that require secure mobile voice communications. Commercially, there are some niche markets but, so far, very few, which may explain why some very interested parties have delayed product and service announcements.

By RON SCHNEIDERMAN

For example, IBM

IBM is the most prominent example. IBM has been equipping its National Service Division customer engineers with Motorola, Inc. KDT 800 portable data terminals. It now has about 20,000 of these terminals in use in 250 cities and expects to add another 50 or so cities by the end of this year.

IBM estimates it takes about 20 seconds to dispatch a service representative using the Motorola system. The same transaction, using a one-way pager and telephone (the system IBM is replacing), requires an average four to five minutes because the technician must find a phone to acknowledge receipt of a call and get additional information about the service call. In addition, it improves efficiency by eliminating the need to have someone read and relay information off a CRT.

The system works so well that IBM figured it could make a few extra bucks with it by reselling excess capacity. By using simultaneous transmission, up to 1,500 data users can be accommodated on a single KDT 800 channel.

Sell off frequencies

If IBM has, for example, 500 field people on a system, it would be able to sell off the remaining 1,000 frequencies in that market and obtain more than one channel per market.

But IBM has backed off the resale scheme, claiming it has more important things to think about. More likely, IBM discovered just what AT&T did — that board-based applications are hard to find.

Motorola may be wrestling with the same problem. In addition to the KDT 800, Motorola also makes the KDT 480, a mobile data terminal, and a cellular data link for accessing computer systems directly from vehicles. The data link is a 300 bit/sec. modem that plugs the modular connector on the mobile telephone handset into the data link. The portable computer or terminal is then connected to the data link via the RS-232C connector.

User interest

The data link has been available for about a year. Motorola started making it because some of its customers had expressed an interest in mobile data communications.

But very few data links have actually been sold, and some of those that have are being used on an experimental basis.

Motorola's data terminal contract with IBM alone is estimated at $100 million. And there's a lot more where that came from, which (as often happens) has created another problem, albeit an internal one. Obviously, Mo-

See AT&T page 18

Schneiderman has been covering the computer and electronics industries as a reporter and editor for more than 20 years.

AT&T rides mobile mart

From page 17

torola would like to rack up more data terminal sales. But which of its related but separate operations will get the business: the telephone marketing organization or the cellular side? Or both? And when? Discussions within Motorola are described by a company executive as "volatile."

Meanwhile, there are also technical problems. Assuming they're left in the car or truck, how well will terminals or computers continue to work in the hot, cold and humidity and in an environment wrought with voltage variations?

Transmission difficulties, resulting in lost data, can be another problem, particularly when customers are handed off from one cell or radio tower to another within the system's area of coverage. But Bell Atlantic Mobile insists this problem has been solved. The system has operated almost flawlessly in field experiments in the data mode, according to the cellular supplier.

Compatibility

Compatibility is another problem. Ameritech Mobile Communications, Inc. in Schaumburg, Ill., markets the Bridge, a modem-like device that allows error-free data transmission over a cellular network, and Span, which enables Bridge to retransmit data if it is lost in transmission. Both were developed by Spectrum Cellular Corp. of Dallas.

Despite interest in its mobile data service, Ameritech Mobile Communications discovered that before it can lock up a commercial account, it must be compatible with a customer's data base, and that can take months.

Who will use mobile data communications? Most large companies now have some form of portable data applications in field test. Rather than simply uploading and downloading information, sales reps could do interactive tasks and begin to develop applications. The AT&T/Bell Atlantic Mobile team sees immediate possibilities from manufacturers' reps and in real estate (as Ameritech has found), where financial programs and data bases are important.

It may take a little time for mobile data communications to develop, but it should be an important addition to existing data services.

PCs, mainframes are not enough

From page 17

(although they may be some day). The PC Network doesn't have enough software to be competitive with the supermicro- and supermini-based solutions from vendors like Digital Equipment Corp., Data General Corp., Hewlett-Packard Co. and Wang Laboratories, Inc.

And the Token-Ring won't attach anything but Personal Computers until early 1987, so it can't get at even the limited functionality of the PS/370 mainframe and PS/36 minicomputer solutions.

Waiting not good enough

Apparently (if we read the customer tea leaves correctly), IBM has decided that keeping customers waiting won't be quite good enough, so it has trotted out the PC-to-mainframe solution, which has the advantage of being available right now.

Whenever a trend moves too far

> ***Apparently, IBM has decided that keeping customers waiting won't be quite good enough, so it has trotted out the PC-to-mainframe solution, which has the advantage of being available now.***

out to the right we correct it by going too far to the left. So if PCs on their own have gotten out of control, the solution will be to overcentralize rather than to apply a more sensible mid-course correction and centralize a little bit, through centrally agreed-upon guidelines and intermediate-level, largely departmentally controlled, processors.

Guess what? That won't work.

Users won't give up the control they've so carefully grown and grown up to deserve. DP departments can't find mainframe software (IBM's or anyone else's) that is competitive with the systems-level features provided by good, departmentally based solutions, and users won't (and shouldn't) settle for less.

Not prepared to provide support

And even if data processing departments could find software, they are not prepared to provide and manage the numbers of support people who would be required to make it all run smoothly.

Besides, who should set marketing department computing priorities — the marketing department or a newly appointed guru in the data processing department who has never worked in the marketing department at all and isn't under its control or direction?

Note that this is not a diatribe against mainframes. We need them. They are just not now (and they may never be) adequate for more distributed solutions to the office computing problem.

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MICROCOMPUTERS

SMALL TALK
Eric Bender

HAL: Not just another add-on

Under the original billing, Lotus Development Corp. was to showcase a new package, but nothing was ready for prime time. So last month's Boston Computer Society meeting saw a work-in-progress view of HAL, the Human Access Language add-on for 1-2-3.

Just as it did in a private demo last October, when we all joined the chorus telling Bill Gross to go talk to Lotus, HAL looked impressive. Gross — who comes across in person like Bill Gates on speed — and his brother Larry worked late into the Pasadena night on pizza and adrenaline and really created something useful.

While HAL offers an English-language interface for 1-2-3, that's not the main point. HAL's real benefit *is* that it tries to figure out what jobs you need to accomplish (like setting up ranges) and carries them out, as Gross said. He predicted that the greatest single payoff will be easier setup requirements.

Among HAL's services, some are new and some not. HAL automatically creates transcripts of work sessions. It offers an UNDO command for file retrieval, work-sheet Erase and other potentially catastrophic moves. HAL can highlight dependencies within a work sheet. It offers powerful Find and Replace features. There's a translation key that translates user requests into 1-2-3 commands and displays those.

Another jazzy (not Jazzy) feature is self-documenting English-language macros. "You're literally writing mac-

See HAL page 25

Bender is Computerworld's *senior editor, microcomputers.*

Dbase tracks crime on-line

Florida investigators keep files on suspects, associates

By Douglas Barney

If you are a narcotics trafficker in Florida, the biggest threat to your livelihood may be the long arm of Ashton-Tates's Dbase III Plus.

The Florida Department of Law Enforcement uses Dbase in criminal investigations to sort, analyze and track information on criminals and suspects. Now the department is working on upgrades of its applications using Dbase III Plus, which also is gathering positive reviews from other users with less dramatic jobs.

Running applications written in the Dbase programming language by special agent Robert Pennington, the department gets information on suspects in seconds instead of days.

"If I have a file of associates of some criminal elements or criminals, I can run comparisons and have the associates and everybody who has similar associates dumped out into a third file," Pennington says. "Then I can find out immediately if two criminals, or two bad guys, might know each other because they are talking to the same associates."

Pennington has written other applications in the same vein, such as a wire-intercept system.

"Every call has data elements associated with it: the number that was dialed, the time, the date, the time when he went on hook, off hook, that kind of thing," Pennington notes. "All that information used to be put on 3-by-5 cards and filed away in shoe boxes. If a supervisor walked in or an analyst asked, 'Did this number get called?' it was not uncommon to spend days sprawled out on a floor with shoe boxes full of 3-by-5 cards. We can now have that information literally in two to three seconds."

And because current wire-intercept devices are based on microprocessors, information from wire taps can be automatically dumped into Dbase files. "We have a separate data base file, which maintains a list of targets, or suspects, and their phone numbers. We can then compare those two

See DBASE page 26

Ashton-Tate sets DBMS pace

By Douglas Barney

Microcomputer data base management software is so dominated by Ashton-Tate's Dbase, which holds some 60% of the market, that Lotus Development Corp. will wait for a crop of machines with a newly upgraded operating system before entering the market. Neither has Microsoft Corp., the second largest independent microcomputer software vendor, tried its luck.

But many firms, some of them veterans, have not been scared away and are still vying for the slice of the pie Ashton-Tate has yet to consume. These firms argue that user dissatisfaction over Dbase's complexity, coupled with a growing market, leaves plenty of opportunity.

Some also argue that Dbase has the largest installed base only because it was one of the first commercial offerings. "They were out first with a high-end data base that did a lot if you knew how to program," says Steven Dow, president of Ansa Software Co., which markets Paradox data base software.

But pessimists point out that the data base market is marked by turmoil, with rampant price cutting, acquisitions and the recent entry of low-priced clones of Dbase.

One example of the fierce competition came last month from Microrim, Inc., the second biggest player with an estimated 10% to 15% share of the market. Microrim announced a promotion that runs until June 30 under which customers receive a free copy its R:Base 6000 package with every order. (According to industry scuttlebutt, a new version of R:Base will appear in the near future.)

See ASHTON-TATE page 24

INSIDE

Many laser printers debut at Comdex/Spring/22

AT&T releases Simul-Task, Unix/MS-DOS system software for the AT&T PC 6300 Plus/24

NEW THIS WEEK

- Insight Development offers emulation software for HP's Laserjet
- Summagraphics upgrades Mactablet and offers Summamouse

For more on these and other new products, see pp. 81-104.

INSTANT ANALYSIS

"You're literally writing macros that are just straight documentation of what you're doing."

— Bill Gross, Lotus Development Corp., on the Human Access Language for 1-2-3

Oracle's SQL★Calc makes a relational DBMS as easy as 1-2-3.

Oracle Corporation has developed a Lotus 1-2-3 compatible spreadsheet and integrated it with its ORACLE® relational database management system (DBMS). The new product, SQL★Calc,® is the first to combine a mainframe-class relational DBMS with an easy-to-learn and familiar PC spreadsheet user interface.

SQL★Calc is designed for 1-2-3 users who've run out of memory, flexibility and patience. SQL★Calc allows you to put SQL database commands into spreadsheet cells... just like formulas. This permits you to access large amounts of data directly from your spreadsheet.

Like all Oracle Corporation products, SQL★Calc runs identically on mainframes, minicomputers and PCs.

SQL★Calc's foundation is the ORACLE relational DBMS, which provides users with a complete set of SQL commands through which they can create, retrieve, modify and otherwise control their data. SQL is the industry standard database command language for large computers. The SQL commands available in ORACLE are identical to the SQL commands in IBM's premier mainframe relational DBMS products, SQL/DS and DB2.

Built on this powerful DBMS foundation is a Lotus 1-2-3 compatible spreadsheet that allows users to put SQL commands into spreadsheet cells in the same way as they enter formulas. When a SQL command for data retrieval is entered into a spreadsheet cell, information is automatically retrieved from the database and placed into the spreadsheet. SQL★Calc also permits users to modify the database – and even create new database tables – directly from the spreadsheet.

SQL★Calc is easy to learn because its menu and command structure are compatible with those of Lotus 1-2-3. And SQL★Calc's ORACLE DBMS requires no supplement: It is vastly more powerful than the database components of 1-2-3, Symphony, Framework, dBase II, dBase III, or any other PC DBMS.

SQL★Calc is available immediately for IBM PC/XTs and ATs for $995.* SQL★Calc will soon be available on a wide variety of systems, including IBM mainframes, DEC, DG, and other superminis, and most UNIX systems.

For further information, or to order your copy of SQL★Calc, call 1-800-345-DBMS. Or write Oracle Corporation, Dept. CS, 20 Davis Drive, Belmont, CA 94002.

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Printer technology advances; price hikes get ink at Comdex

Strong yen forcing some prices up

By David Bright

ATLANTA — Last week's Comdex/Spring '86 saw the debut of a number of laser and other desktop printers that were said to mark advances in price/performance and functionality.

However, there was one negative note for customers: Several vendors of Japanese-made printers were preparing to increase prices because of the strong value of the yen. Some major suppliers, including Epson America, Inc. and Citizen America Corp., have already raised their prices. Epson's prices have risen 5% to 15% on selected models.

With its $1,895 Laserpro Express, Office Automation Systems, Inc dropped price points slightly for laser printers. The Laserpro Express emulates Hewlett-Packard Co.'s Laserjet, Diablo Systems, Inc.'s 630, Qume Corp.'s Sprint 11 and Epson's FX-80 printers and reportedly has a duty cycle of 10,000 pages per month.

Available in July, the Laserpro Express provides 300 by 300 dot/in. resolution, 10 bit-mapped fonts and 384K bytes of memory. Office Automation Systems should continue to lower the prices of laser printers, marketing support manager Al Rocheleau predicted.

The Laserpro Express undercuts by $100 the price of QMS, Inc.'s 6 page/min Kiss laser printer introduced last fall. Art Hyzer, QMS executive vice-president, suggested that $1,500 is the next logical step in the price-cutting process.

QMS introduced the Big Kiss laser printer, a $2,995, 8 page/min unit that offers 17 resident fonts and ANSI X3.64 support as well as Diablo, Qume and Epson emulations, 640K bytes of random-access memory (RAM) and maximum graphics resolution of 300 by 300 dot/in. QMS rates the duty cycle at 5,000 pages per month.

Digital Equipment Corp. introduced the LN03 Plus, which offers 1M byte of full bit-map memory and Tektronix, Inc. 4010/4014 compatibility. The printer costs $4,995 and will begin delivery in June. DEC's original LN03 printer, now priced at $3,495, can be upgraded to the new model with a $1,595 kit.

AST Research, Inc. introduced its first laser printer, a $4,995, 8 page/min model intended for high-volume, multiuser environments. The Turbolaser can print 5,000 to 10,000 pages monthly, with a life expectancy of 600,000 pages, according to AST.

Available in July, the 300 by 300 dot/in. printer can emulate standard text printers and graphics plotters using HP's Graphics Language, and it supports HP's Lasergraphics Language desktop publishing package. A variety of bit-mapped fonts, including fixed-pitch and proportionally spaced text, are resident.

Ink-jet printer unveiled

While the laser printer competition intensified, start-up Howtek, Inc. took another tack with the Pixelmaster color ink-jet printer. "We expect our technology to do for office printing and desktop publishing what Technicolor did for movies and Kodachrome did for film," stated Howtek Chairman Robert Howard, who also founded Centronics Data Computer Corp.

Priced at $2,995, the Pixelmaster uses a crayon-like solid plastic ink to eliminate clogging and to provide sharper, raised, near-offset-quality print, according to Howard. The ink is heated and liquified, then shot through the rotary print head onto standard paper.

The unit offers 240 by 240 dot/in. resolution at 2 page/min for text and 4 page/min for graphics. Production shipments will not begin until sometime in the fall, and distribution will initially be through OEMs.

Hoping to continue the popularity of its 24-wire dot matrix printers, NEC Information Systems, Inc. introduced the Pinwriter CP6 and CP7 color models, with respective prices of $849 and $1,049. With their 360 by 360 dot/in. resolution, the seven-color printers eliminate the need for pen plotters, said Bruce Thatcher, director of peripherals marketing. The 80-col. CP6 and the 136-col. CP7 produce 216 char./sec. in high-speed mode, 180 char./sec. in draft and 65 char./sec. in letter quality.

At 100 char./sec., Star Micronics, Inc.'s new NB-15 dot matrix printer offers one of the highest letter-quality speeds on the market. The 24-wire NB-15 retails for $1,449 and prints at 300 char./sec. in draft-quality mode.

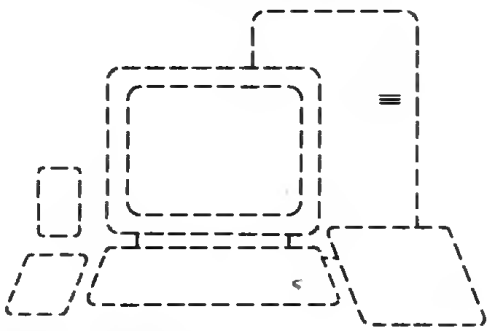
Star also announced the $379 NL-10 dot matrix printer, a nine-wire, 120 char./sec. model featuring plug-in interface cartridges that make it compatible with the IBM Personal Computer and most PCs.

Since Star's printers are made in Japan, the rising value of the yen may force Star to raise prices on existing models, said Tom Bongiorno, director of marketing.

And at Okidata Corp., moderate price increases are inevitable, according to marketing director Jim Cullen. "The pressure is on," he said.

Senior writer Peggy Watt contributed to this report.

Think.



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Televideo uncages Personal Computer AT compatible

Desktop unit said to be faster, smaller than AT

By Peggy Watt

ATLANTA — Televideo Systems, Inc. last week celebrated the "Year of the Tiger" by introducing the Telecat-286, a $2,995 IBM Personal Computer AT-compatible microcomputer.

The new desktop system, which was unveiled with a real (and heavily sedated) tiger at a Comdex/Spring '86 press conference, is said to be both faster and smaller than both the IBM PC AT and an earlier Televideo AT clone, the Tele-286.

Available now, the Telecat-286 runs at 8 MHz, but can switch to the AT-standard 6 MHz for software requiring the slower speed. The system comes with a standard 512K bytes of random-access memory and sockets for a full megabyte of on-board memory; one 1.2M-byte floppy disk drive; five expansion slots; and one serial port and parallel port.

A 30M-byte hard disk drive is optional, and the system comes with Microsoft Corp.'s MS-DOS 3.1. Televideo said the Telecat-286 measures 16 in. by 16½ in., providing a footprint 28% smaller than the IBM PC AT.

Televideo envisions the Telecat-286 as a powerful single-user system for users of Intel Corp. 80286-based systems who want a stand-alone PC. The firm's older Tele-286 is positioned as an alternative AT-compatible file server, not as competition for the new micro, said K. Philip Hwang, Televideo Systems founder and chairman. Hwang said Televideo will step up dealer support, offer training programs and promote a trouble-shooting service.

According to Hwang, the Sunnyvale, Calif.-based company, which last year posted its first loss in 10 years, is already recovering from "too rapid growth."

Last year, the company dropped from 1,270 to 650 employees but has now rebuilt to about 700 employees, Hwang said. Televideo wrote off more than $80 million in inventory, which Hwang said remains steady at $20 million now.

Other Televideo announcements at Comdex included the Networkstation, a $995 diskless workstation intended for use with Televideo's Personal Mini multiuser PC networks.

It also introduced the PT100 terminal, a $499 system with Digital Equipment Corp. VT100 and VT52 compatibility, and PM/Link, an option to the PM/Netware 2 system software for Televideo's Personal Mini network product line that allows larger configurations up to eight groups of 16 workstations.

Televideo also showed two new earlier-announced graphics terminals, the 995 and 9220 Graphics for Tektronix, Inc. Plot 10 programs, both priced at $1,129.

Dest enhances optical scanner

MILPITAS, Calif. — Optical reader manufacturer Dest Corp. has enhanced its Text Pac software, which runs Dest's PC Scan hardware, to read dot matrix output and transfer written material into a greater variety of word processing programs.

Text Pac Version 2 can put scanned text into formats compatible with Microsoft Corp.'s Word, Satellite Software International's Wordperfect and Multimate Corp.'s Advantage word processing programs. The original version supported the IBM Displaywrite 3, Multimate's word processing programs and Micropro International Corp.'s Wordstar and Wordstar 2000 formats.

The new release also permits PC Scan to read, in a single pass, dot matrix output from the IBM Proprinter, Okidata Corp. Microline 92 and 192, Epson America, Inc. FX-85, 185 and LQ1500, Hewlett-Packard Co. Think Jet and Star Micronics, Inc. SQ10 printers. The system can read output printed in 10 pitch, 12 pitch and proportionally spaced type fonts.

Text Pac Version 2 is $595, the same price of the original version. Owners of Version 1 can upgrade through their dealers for $95.

"We have a continuing effort to add word processing programs," said Pat Groves, Dest marketing director. Dest also is refining graphics scanning and hopes to release additional enhancements in that area, he said.

Groves said corporate customers, who are keeping more records on-line but are slow to convert older materials that are still put into filing cabinets, are just becoming aware of the potential of scanners.

Dest's orders have been steady, and the company's officers are pleased with the projected fiscal year results, due out in May, Groves said. Last year's earnings were $2.6 million on revenue of $18.6 million.

In March, the company introduced four low-end scanners for dedicated word processing systems in addition to its Workless station document reader. Those machines also picked up some of the slack in OEM sales, which were once a mainstay of Workless marketing but slowed last summer, Groves said.

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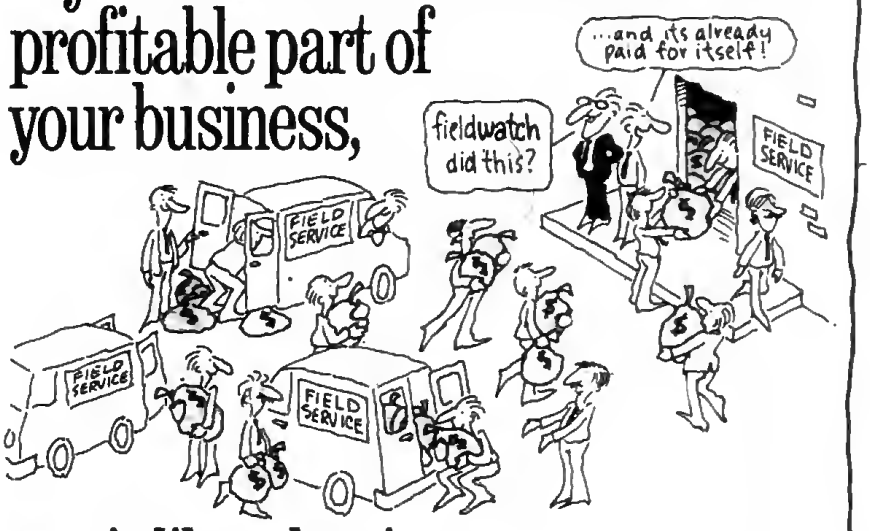

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Ashton-Tate sets DBMS pace

From page 19

Mail order firm Diamond Software Supply is currently offering R:Base 5000, which lists for $700, for only $349, with the free copy.

Other price cuts abound. Analytica Corp.'s Reflex sold for $495, but after being acquired by Borland International, Inc., its price was slashed to $99 and then raised to $149.95. Enrich from Migent Software, Inc. dropped to $395 from $595, and the price of Powerbase from Powerbase Systems, Inc. was cut from $595 to $349.

Bob Leff, cochairman of Software distributor Softsel Computer Products, Inc., calls this arena a no-man's-land. "They couldn't make it at $495 to $595." Leff, however, says he believes that the lower prices may help to boost sales.

Despite its pressures, microcomputer data base software is still one of the fastest growing software markets, vendors say. And it contains many niches.

Some firms attempt to face Ashton-Tate head-on by providing products with lower prices and more features or ease of use. Ansa's Dow, like many others, says there is room for his firm's package because users are dissatisfied with Dbase.

But others plan to coexist with Ashton-Tate. Wordtech Systems, Inc. of Orinda, Calif., gives the most recent example of this strategy with DBXL, introduced at Comdex/Spring '86. This $169 Dbase III Plus workalike uses Dbase III Plus data and index files, provides networking capability and supports Dbase III Plus syntax as well as its report and format files. It targets users interested in a powerful, Dbase-style package at a sharply reduced price.

Similarly, Alpha Software Corp. of Burlington, Mass., is set to introduce Data Base Manager III, a package that directly reads Dbase III disks but offers more menu-driven capabilities. Alpha's package, according to analysts, will sell mainly to users in large corporations that desire an easier-to-use data base that easily shares Dbase III data.

Jeffrey Tarter, publisher of the "Soft-Letter" industry newsletter, says that the only firms that will survive will be those with Dbase file-compatible products. "The question is whether they can really take a Dbase disk and read it," Tarter says.

Others, such as Migent's Enrich, the $600 Dataease from Software Solutions, Inc. and the recently introduced Simple, a $995 package from Los Angeles-based Software Merchants Unlimited, push ease of use and ease of generating applications.

All data base vendors, it seems, expect high growth in sales. Arun K. Gupta, president of Software Solutions, expects his firm's market to increase by a factor of five. The firm has already sold more than 70,000 copies, according to Gupta.

Kent Johnson, president and chief executive officer of Microrim, says the data base market is growing 30% to 35% per year, and Microrim has sold some 100,000 packages. The firm became profitable last July after 2½ years of operation. Sales doubled from $8 million for calendar 1984 to $16 million for 1985, and sales continue to increase, he says.

Microrim plans to continue to build a family of products around data base technology and charge for support, he added. "I think we can build a $100 million company on those strategies."

UNIX & 'C'

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AT&T tool runs MS-DOS, Unix simultaneously

By Douglas Barney

ATLANTA — AT&T Information Systems is scheduled to release Simul-Task this month, about six weeks behind the original shipping schedule. The system software, formerly called Unix/OS Merge, allows Microsoft Corp. MS-DOS applications to run simultaneously with Unix applications on AT&T microcomputers.

Simul-Task, demonstrated at Comdex/Spring '86 in Atlanta along with several other AT&T introductions, currently runs only on the AT&T PC 6300 Plus, a microcomputer based on the Intel Corp. 80286 microprocessor. AT&T maintains that the multitasking benefits of Simul-Task can greatly increase a user's productivity. A user could, for example, receive electronic mail while running a data base application and write a report.

In addition, AT&T claims that corporate developers can use Simul-Task to modify existing MS-DOS applications using Unix commands. Simul-Task also has features such as unattended job scheduling and software-based security that typically are unavailable within MS-DOS.

At Comdex/Spring, the firm also displayed the AT&T PC Image Director, an integrated graphics software and hardware package that allows users to scan, view, edit, store, send and print a variety of documents. It includes a document scanner, scanner interface board, high-resolution monitor, graphics board and PC Image Director Software. A complete system costs $2,835.

In addition, AT&T showed, and said it plans to introduce, an Enhanced Memory Expansion Board that provides 2M bytes of random-access memory for the AT&T PC 6300. The board supports expanded memory for MS-DOS applications and allows AT&T Unix System V applications to use the additional memory.

HAL: Easier than 1-2-3

From page 19

ros that are just straight documentation of what you're doing," Gross remarked.

Throughout all of this, HAL was designed to stay sensitive to a given context — you can say "copy this" and get an appropriate response. Help features keep this sensitivity and can "actually generate the words you can continue the sentence with," Gross said.

HAL will be sold as a stand-alone product for 1-2-3 releases 1A and 2 this fall. This is about a year after the previous version was scheduled to ship, leading those with suspicious minds to ask whether it's development or marketing that is causing all the delays.

Naturally, Lotus officials would not comment on pricing or on some technical details such as how much memory HAL requires. (The first version, which was weeks away from shipment when Lotus bought the Gross' firm, took up 120K bytes.)

> ***Dan Bricklin, developer of Lotus' Visicalc, raised the crucial question about HAL's add-on role: "Couldn't you provide the whole thing with one metaphor?"***

However, Dan Bricklin, developer of Lotus' Visicalc, raised the crucial question about HAL's add-on role: "Couldn't you provide the whole thing with one metaphor?"

Two answers

Why not make it part of 1-2-3? Lotus responded with two answers.

First, the company doesn't want to struggle through another major release of 1-2-3 this year. And second, some people just won't want to buy HAL. Trying to underline that point, one official said that it makes sense for users to learn 1-2-3 before moving to HAL.

But that's nonsense from a design point of view. (*First*, we'll teach you about simple commands like "/pripo," and *then* we'll get to the difficult stuff like "print this.")

Selling HAL as an add-on would generate additional revenue, and Lotus is not in the business of continually revising its software and selling it as inexpensively as possible. Lotus shouldn't be; that's a role for riverboat gamblers like Borland International, Inc.

Lotus, instead, is grappling with the task of trying to get two million people to move roughly in step, without ever quite putting their wallets back in their pockets.

As 1-2-3 has become *the* environment for financial analysis software, competitors starting over from scratch (like Javelin Software Corp.) are bucking a riptide, however well-crafted their software.

And there's a never-ending parade of 1-2-3 add-ons, ranging from the ridiculous (or at least humorous, like Solar Systems Software's Templates of Doom) to the potentially sublime (like General Optimization's What's Best programming software). In these cases, add-ons are the way to go.

But from a user's point of view, omitting HAL from the next major release of 1-2-3 makes no sense at all.

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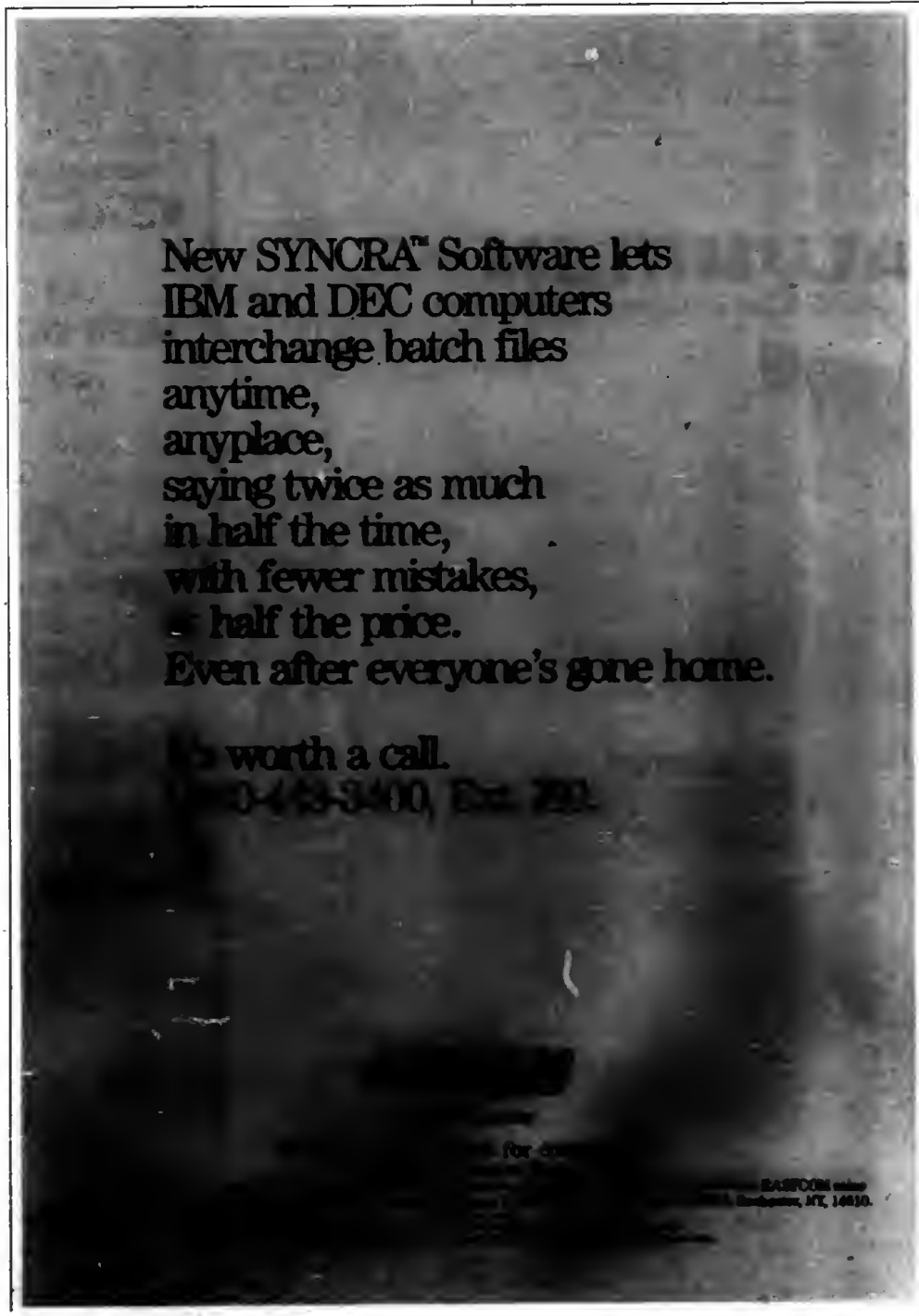

Dbase tracks crime on-line

From page 19

files and see if they are calling anyone in our target or suspect file and, if so, immediately provide an identification on the number that the bad guy called."

Although the Florida Department of Law Enforcement has other computer systems, its agents rely most heavily upon Dbase for help in investigations. "From what we would call a tactical data processing level, the only thing we are really doing is Dbase," Pennington says.

Dbase III Plus, which shipped in January, has many features not found in Dbase III. These include the ability to run on local-area networks, new commands for programmers and the Assistant, a menu-driven interface with relational capabilities that was formerly available mainly as a teaching tool for Dbase, without relational ability. With the new Assistant, users can update, create and obtain information without using the Dbase programming language.

Enhanced programming

Pennington is most interested in the enhanced programming capabilities. "I moved up to Dbase Plus because I wanted to know what it would do," he says. "I upgraded as almost an automatic procedure to see what was new in Dbase."

The special agent says he found several new commands that make the upgrade worthwhile. "One command that is so simple that just jumped out at me immediately (that I thought Dbase needed years ago) was the On Error command, which allows you to write a routine to have something happen when the operator makes an error. In the past, a lot of times if you made an error, then the program would just bomb."

While not all Dbase applications are as exciting as chasing criminals, each serves an important function for users, such as First Bank System, Inc., a Minneapolis-based bank holding company.

"We do a lot of mass mailings where people will store customer files for a mailing," says Donna Staats, manager of the micro center for First Bank System. "And we use it here in the micro center. We have had about 1,800 students come to our training classes, so we maintain a large student data base where we keep information about what kind of classes students have gone to, when they have been scheduled and so on. We also produce our billing at the end of the month from that."

Networking needs

First Bank System is now upgrading to Dbase III Plus, in large part to meet future networking needs. "Since we are going onto the networks, we want to make sure that we don't have to rewrite all our programs, and yet we wanted a data base that would work in a local-area network environment. That didn't give us a whole lot of choices," Staat says.

Perhaps the biggest selling point for Dbase III Plus is the already widespread use of Dbase II and III. "We have set standards so we can say to our employees, 'This is the standard. This is the package that the micro center is going to support. This is the package you can get training for,' " Staat says.

Another Dbase III Plus fan is Les Helgeson, senior training specialist for Beatrice Food Co. of Chicago, who has only minor reservations about the product. "Dbase III Plus has some significant benefits over Dbase III that I am trying to get across to people." Helgeson particularly likes the View capability, under which up to 10 files can be viewed simultaneously.

Multiple relationships

However, Helgeson hopes that Ashton-Tate will improve the product's ability to handle multiple relationships so that he can compare data from more than two files simultaneously. "Multiple relationships are the key to most applications, and Dbase III doesn't handle them real well. Dbase III Plus doesn't do an excellent job either, but at least it is better," Helgeson says.

What Helgeson likes most about Dbase III Plus is the menu-driven interface and its ability to run on local-area networks. "We have one group right now that is implementing a network and is looking for software that will work on the network. I am sure they will be using Pius on their small system," Helgeson says.

Ashton-Tate's upgrade policy makes it relatively painless for Beatrice to convert. Under this program, customers can upgrade a minimum of 25 copies of Dbase or 25 copies of Framework for $75 each, and the customer does not have to return the original disks or documentation as long as these are destroyed.

Dbase III Plus is a popular product. Ashton-Tate sold more than $20 million worth of Dbase III Plus in its first month in January, and more than 300,000 of the original Dbase III have been sold since that product debuted in June 1984. But corporate customers still have complaints.

"Get rid of copy protection; it is the most bothersome part of the whole thing," says Dave DeVries, senior systems analyst with First Bank System.

Ashton-Tate officials respond that they are seriously considering the removal of copy protection.

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Robert Silverstein

Mixing public data nets, SNA

More and more companies are supplementing their leased-line-based data communications networks with packet switching network services. Public data networks offer cost advantages over leased lines, particularly for companies in which terminals are scattered over a large geographic area, at sites that generate light data traffic.

However, users who are considering using public data networks in conjunction with a leased-line network should be aware of the protocol compatibility issues involved. While this column concentrates on considerations that apply to Systems Network Architecture (SNA) networks, the integration of other vendor network architectures with public data networks involves the same type of approach.

The basic problem is how to interface X.25 packet switching protocols with the asynchronous, bisynchronous, or Synchronous Data Link Control (SDLC) protocols used by the host and terminals.

Several approaches have been used. The most simple method, in terms of the changes required of the terminals and host, is to use packet assembler/disassemblers at terminal and host

See MIXING page 35

Silverstein is a senior consultant in the architectures and protocols group at Network Strategies, Inc. in Fairfax, Va.

Telecom firms lure investors

Start-ups with new ideas seen as hot prospects

By Stanley Gibson

"When you've got an industry in turmoil, you've got a great opportunity for investment," said Robert Morrill, a general partner with Hambrecht & Quist in Wellesley, Mass.

Morrill was referring to the telecommunications market, where divestiture has saddled users with new problems that require new kinds of products. Start-up companies are scrambling to fill those needs as well as to address specialty niches created by the convergence of computer and communications products, he said.

While the computer industry has at least temporarily lost its attraction for many venture capitalists, investment in the telecommunications arena continues to grow at a steady pace, according to an upcoming report, "Trends in Venture Capital," to be published by Venture Economics of Wellesley Hills, Mass.

"Venture capitalists are financing local-area network component companies. That's where the action is," a Venture Economics spokesman said. He added that the major players in the market have already been decided so that growth will center on companies that supply equipment that the market leaders will incorporate into their systems. The Venture Economics study also shows strong investment in fiber-optic companies, satellite companies, multiplexer makers and consulting firms.

"The divestiture of AT&T, coupled with deregulation of all customer-premise products and services and most common-carrier services, has created an environment of explosive growth. We're looking at a market that will be $150 billion to $200 billion by the early to mid-1990s," said Dixon Doll, a telecommunications consultant and manager of the Accel Telecommunications Fund.

According to Doll, the Accel fund has

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TRW to resell Banyan products

By Elisabeth Horwitt

In a strategic alliance that meshes their complementary product and marketing strengths, Banyan Systems, Inc. and TRW, Inc.'s Information Networks Division recently signed an OEM agreement for TRW to resell Banyan products as part of TRW's networking product line.

"We both think it's a very compatible relationship," said Banyan President David Mahoney. The products have already been working together for several months, he noted. On a departmental or work group level, Banyan's server offers a choice of IBM Personal Computer networking options. PCs can be linked directly to the server or through one of several micro networks supported by Banyan.

On the corporate networking level, TRW's Concept 2000 boards, installed in the expansion slots of Banyan servers, provide a broadband backbone that links multiple departmental PC networks into one communications system, Mahoney said. Banyan also provides gateways to IBM and asynchronous hosts. "We are providing products that significantly extend TRW's range of network offerings," Mahoney claimed.

Banyan also benefits from the agreement by gaining access to TRW's customer base of large government organizations and corporations, Mahoney noted. Responding to such companies' requests for quotations requires "a large upfront and

See TRW page 32

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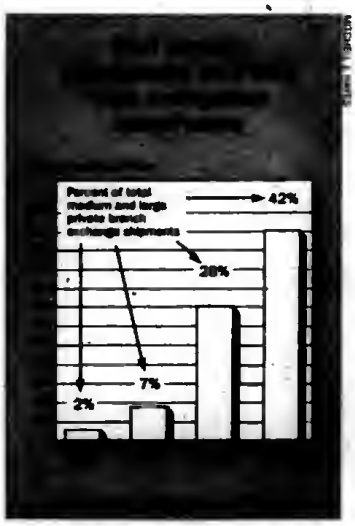
INSTANT ANALYSIS

"For ISDN to work, there has to be an end to finger pointing; vendors have to assume end-to-end responsibility beyond the demarcation line where their technical responsibility ends."

— Patrick Krause, telecommunications director, McDonald's Corp., at Comten Users Exchange meeting

PABX-computer links on rise



T1 links earmarked for 200% growth rate

By Elisabeth Horwitt

NORWALK, Conn. — A growing demand for T1-based computer-to-private branch exchange interfaces should give the voice/data private automatic branch exchange (PABX) systems market a much-needed shot in the arm, according to a recently published report from Norwalk research firm International Research Development, Inc.

The report forecasts a 200% annual revenue growth rate for PABXs equipped with such interfaces; approximately the same growth rate that International Research Development predicts for T1 links, senior consultant Leslie Townsend said. She added that the demand for T1 links will continue to rise, "whether or not Integrated Services Digital Network

See PABX page 36

ETL to assume certification service for IBM Cabling System

By Elisabeth Horwitt

CORTLAND, N.Y. — The Network Cable Certification Program, a service that tests whether cable products meet IBM Cabling System specifications, is now being administered by ETL Testing Laboratories, Inc. of Cortland, an ETL spokesman said last week. The service will supercede IBM's own qualification program, with the two programs overlapping until May 31 to provide a smooth transition, ETL said.

Close supervision and quality assurance is important "because the high bandwidth requirements of IBM's Token-Ring network will stretch copper cable to its performance limits," said James Williams, vice-president of business operations at ETL. IBM has researched different types of copper cable construction that can carry large masses of data, including a foam-insulated, twisted-pair copper conductor that reportedly could support 20M bit/sec. data rates, he added.

Several different types of copper cable that IBM had specially designed for its Token-Ring network are "very closely rated for impedance, cross talk, signal attenuation, capacitive imbalance," Williams said. "We will be closely observing participating cable manufacturers for performance and quality to ensure that they meet those specifications."

The program is open to all manufacturers of network cable designed to meet IBM specifications, Williams said.

ETL employees will perform weekly factory inspections during which samples will be taken for laboratory testing. Cable that ETL inspectors find to be up to stan-

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TRW to resell Banyan products

From page 31

long-term investment from the supplier in terms of network planning, development, training and support," according to Mahoney. "Banyan does not have the resources to target this market; TRW does. They're letting a little company play in a big field."

TRW chose Banyan products for their versatility, according to TRW's general manager of information networks, J. Edward Snyder. "The server uses an IBM PC backplane, so that it can link into 3Com Corp., Sytek, Inc., IBM's Token-Ring, any network that has an IBM PC interface. They just have to write the software driver. If the customer already has a 3Com network, we can protect his investment." Adding Banyan networking products to its own line should strengthen TRW's position in the systems integration arena, he explained.

He added that TRW estimates systems integration revenue will be $15 million this year. "As a turnkey supplier to large organizations that need a lot of PCs, data base and peripheral sharing, we need to offer a range of products — and we can't invent them all ourselves."

Paul McHugh, manager of network services at TRW customer Cleveland Clinic Foundation, Inc., agrees with McHugh's assessment. "The TRW-Banyan alliance gives TRW an edge in the networking market that their products formerly lacked, especially in the PC arena," he commented.

Approximately a year and a half ago, Cleveland Clinic installed a broadband network based on TRW's Concept 2000 boards. "We are in the process of switching" from a Burroughs Corp. to an IBM mainframe, McHugh said. "The network enables users to get used to accessing an IBM host while still retaining access to the Burroughs."

The network also supports the clinic's surveillance security system and may support voice communications in the future, McHugh noted.

Cleveland Clinic became a beta test for TRW's newly integrated Banyan product line because "many of our departments use IBM PCs a lot," McHugh said. The company has approximately 100 Personal Computers now and expects to have 400 to 500 by the end of the year. Banyan's server, connected to TRW's broadband network, enables IBM PC users to "maintain their own files and access mainframe files that have been downloaded to the server," McHugh said.

Eliminating the need for direct micro-to-mainframe connections saves Cleveland Clinic the cost of equipping each micro user with an IBM 3270 terminal emulation board and also avoids overloading the host with user data requests, he explained.

Download from a VAX

Departmental users also will be able to access medical diagnostic data that has been downloaded to Banyan servers from the clinic's Digital Equipment Corp. VAX, McHugh added. "This will eliminate the need to supply IBM PCs with asynchronous terminal emulation boards."

The clinic currently is testing one Banyan server in prototype mode, McHughs said, "to see if it does everything we want it to do. If it's cost-justifiable, as seems likely now, we will install 40 to 50 servers around July 1." The clinic is still unsure whether Personal Computers will be linked directly to Banyan servers or over Ethernet networks.

Integration of Banyan and TRW's product lines provides customers with a wider range of networking choices, Mahoney commented. "PCs can be clustered, or linked over an Arcnet or Corvus Omninet at the departmental level; then the various networks can be linked over a broadband backbone." Banyan also provides IBM mainframe gateways.

The contract with Banyan is the second of its kind for TRW. Late last year, the company agreed to sell Bridge Communications Corp.'s Ethernet-based communications servers and gateways. TRW and Bridge are also jointly working on gateway products.

"Some additional minor OEM agreements are in the works, but Bridge and Banyan are the main ones for now," Snyder said. The three companies' network offerings together should answer 80% to 90% of all customers' connectivity needs, he added. "The rest involves more specialized products like satellite links or laser bridges." TRW's next major agreement should be with a wide-area networking vendor, Snyder noted.

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ETL to assume service

From page 31

dard will be marked every few inches, "to assure users that their cable meets all IBM specifications for local-area network system performance," he added.

Among the types of IBM network cable certified by the program are Type 1, two twisted pairs designed to carry data only; Type 2, two twisted pairs for data and four twisted pairs for voice; Type 6, patch-panel data cable; Type 8, under-the-carpet data cable; and Type 9, two twisted pairs carrying data only.

"As far as we know, these cable types are what IBM is specifying to be used in its current network," Williams said. "As other cable is introduced into the net, we'll be certifying it. IBM won't say what type of cable that will be; you know IBM."

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Telecom firms lure investors

From page 31

raised some $65 million, which he said he believes is the largest source of capital solely for the telecommunications industry. Investors in the Accel fund include U.S. West, Northern Telecom, Inc., Hasler Ltd. and the pension funds of AT&T, Bell Atlantic Corp. and GTE Service Corp. as well as a number of financial institutions.

Doll said his strategy is to invest not only in start-up companies but in established companies that need follow-on financing. He said the Accel fund has concentrated its resources in the following areas: Integrated Services Digital Networks, network management, T1 multiplexers and switches, multivendor connectivity, advanced switching and communications software.

A similar project, based in San Francisco, is the Hambrecht & Quist Communications Ventures fund, which should raise $30 million to $40 million within a year, according to General Partner Cliff Higgerson.

Boston-based TA Associates has been looking for companies that sell products to divested Bell operating companies, according to Andy McLane, a TA Associates general partner. Before deregulation, the Bell operating companies purchased many products from AT&T that they now can buy from other suppliers, McLane explained.

"We're excited by the industry," McLane said, adding that TA Associates has invested in some 12 telecommunications companies in amounts ranging from $1 million to $10 million.

Some of the investors in start-ups are equipment manufacturers that desire to sell the young companies' products under their own label. Infotron Systems Corp., for example, already built low-end T1 multiplexers but desired to expand its line by adding a high-end system.

Rather than incur the cost of research and development, the company chose to invest in Network Switching Systems, inc., an Andover, Mass., start-up that is developing a high-end T1 multiplexer. A combination circuit and packet switch, the product will handle voice, data, image and video transmissions.

Network Switching Systems has received two rounds of venture capital totaling $12 million from a variety of investors. Infotron purchased just under 20% of Network Switching Systems' stock and acquired the nonexclusive rights to market Network Switching Systems' equipment, according to Infotron President and Chief Executive Officer Jim Hahn.

Now a Network Switching Systems beta test site, Infotron has two Network Switching System units connected to T1 lines, Hahn said.

Anticipating two more beta tests this year, Network Switching Systems plans to ship products in the second quarter of 1987, according to Harry Ruda, Network Switching Systems vice-president of sales and marketing.

Variety of investment sources

Some other firms that have recently attracted investment from a variety of sources include the following:

• Netlink, Inc. The Accel fund has invested in Netlink, a Raleigh, N.C., maker of Systems Network Architecture (SNA) gateways. Netlink was founded in Australia in 1982 by several former IBM employees.

"There are lots of holes in SNA that need to be filled," said Netlink spokesman David R. McCormick. The company has so far produced an 3703 network processor and hub that links multiple Hewlett-Packard Co. devices to an SNA environment. With more than 1,000 boxes installed, Netlink had $2½ million in revenue last year and this year expects $6 million, according to McCormick.

• Advanced Business Comuunications, Inc. When Advanced Business Communications founder John Israel built a central office switch for the Italian telephone company Italtel, some private investors urged Israel to produce a similar switch for the U.S. market. The result, introduced in the spring of 1985, was the Multiple Applications Exchange. Aimed at long-distance carriers, the digital switch supports up to 24,000 ports.

The Dallas-based company recently signed an order for 10 tandem switches for the Telcore Digital Network in California, which plans to build a nationwide network to be used by long-distance carriers. Eventually, Advanced Business Communications plans to sell its equipment to corporate users.

• Quanta Communications Systems, Inc. Founded in 1982 and expecting $5 million in sales this year, Quanta of Anaheim, Calif., makes a 32-channel fiber-optic multplexer that transmits at a top speed of 64K bit/sec.

"We feel we have the top-of-the-line fiber-optic multiplexer," said Quanta founder and President Howard Rush, who also said he believes fiber-optic cable will increasingly be a medium of choice for building networks.

Quanta has OEM agreements with Racal Milgo Information Systems, Inc. of Florida and with Racal Milgo Ltd. in Great Britain. Racal Corp. owns a large percentage of Quanta stock.

One of the liveliest areas of innovation and start-up activity in the past few years has been the T1 multiplexer realm. But Doll of Accel offered the view that some of the large number of companies active in the T1 arena will not survive beyond the next few years. "The T1 mux area may not be able to go much further because it is fully populated now," he said. "There will probably be a shakeout."

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Mixing public data nets, SNA

From page 31

sites. The packet assembler/disassembler takes data off a communications line from either a host or terminal, places it in an X.25 packet and sends the packet to the oearest public dsta network node over s dial-up or private line.

The double packet assembler/disassembler sproach may be the easiest to implement, but it does have several drawbacks. The first is respoose time. This will not be s problem if s packet assembler/disassembler supports only asynchronous terminals sending short messages, but be careful with bisynchronous IBM 3270 terminals where transmissions sverage 1,000 characters or more. Each additional piece of equipment that the message must go through will add to response time.

Implementing packet assembler/disassembler functions in s separate box also prevents the user from extending X.25 time division multiplexing capabilities all the wsy to the front-end processor. Instead of having multiple devices share one communications link to the front-end processor, you must have one lioe and port per terminal.

This leads to the next alternative, which is to implement X.25 functionality in the front-end processor. In the IBM and IBM-compatible world, there are three software products that provide this capability: IBM's Network Control Program Packet Switching Interface (NPSI); Network Access System from Comm-Pro Associates, which runs on s communications processor such as an IBM 3705 or 3725 or plug-compatible front-end processor; and NCR Comten, Inc.'s X.25 Interface to Packet-Switched Networks, which requires an NCR Comten front-end processor.

IBM's NPSI will serve to exemplify the capabilities of implementing X.25 functionality in the front-end processor. NPSI takes care of converting X.25 packets to SNA protocols, and vice versa, at the host end. If asynchronous terminals are involved, no protocol conversion is necessary at the terminal end because all public data networks support asynchronous protocols. IBM mainframes do not, however. The NPSI thus takes on the additional job of setting up dummy sessions so that the host thinks it is communicating with an SNA device.

Dummy sessions are unnecessary if the X.25-based terminal-to-host connection involves s real SNA device such as an IBM 3274 controller.

However, protocol conversion is needed before synchronous terminals can transmit via s public data network. Three options are svailable: s converter can be built into the SNA controller; special High-Level Data Link Control packet assembler/disassemblers can perform conversion between X.25 and SDLC; or the Network Interface Adapter, svailable from IBM, can be used.

The last type of device commonly found in an SNA network is the bisynchronous 3274 controller. Unfortunately, messages from bisynchronous 3270 terminals must be processed by s special VTAM program before NPSI will allow them to pass through the front-end processor to the host.

More practical alternatives include implementing on the front-end processor Comm-Pro or NCR Comten software that includes the required conversion capabilities or using the double packet assembler/disassembler approach described earlier

As can be seen, there are s oumber of issues to resolve when implementing an SNA network over public data network facilities. The decision to use them can clearly save money, but beware of taking s wrong turn along the way.

PABX-computer links on rise

From page 31

starts to displace private networks."

The computer-to-PBX interfaces themselves make up only s small portion of PBX vendors' total revenues, according to Townsend. Internstional Research Development reported $3.17 million in interface sales for 1985 and predicts sales of $24.1 million in 1995.

T1-based computer-to-PBX interfaces enable users to connect multiple terminals and hosts over 1.54M bit/sec. links, either locally or over s distance, Townsend noted. The PBX connection provides flexible switching capabilities and also enables companies to "use excess T1 capacity for voice transmission, especially during off-peak periods," she added.

An important development in this market, the report stated, is industry support of s standard computer-to-PBX interface. At this time, there are two competing standards: Computer-PBX Interface (CPI), jointly developed by Northern Telecom, Inc. and Digital Equipment Corp., and AT&T Information Systems' Digital Multiplexed Interface (DMI). According to International Research Development, CPI is the current leader with 58 PBX interfaces shipped during 1985 and approximately 100 licensed vendors.

However, the research company concluded, CPI may lose ground over the long term because it is incompatible with Integrated Services Digital Network (ISDN) specifications for clear 64K bit/sec. transmission and s separate channel for signaling. DMI's closer conformance to ISDN will prove "s more likely long-term strategy," the report said.

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IBM Personal Services/PC	Yes	Yes
DOS Runs In Background	Yes	Yes
Available In PC, XT & AT	Yes	Yes
Host Printer Session	Yes	No
IRMA® Emulation	Yes	No
Available in Non-IBM PCs	Yes	No
Upgrades For Existing PCs**	Yes	No
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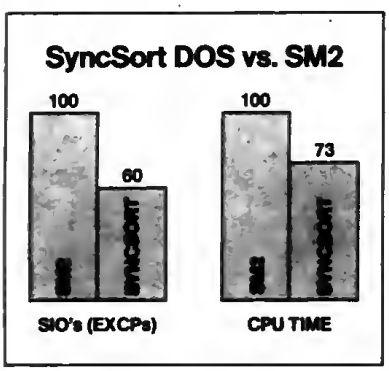

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SOFTWARE & SERVICES

SOFTLINE
Edward Warner

Ada goes civvy with SDI boost

The Strategic Defense Initiative (SDI), a multibillion-dollar research and development effort to shoot down enemy missiles with everything from lasers to high-speed projectiles, has been attacked as a threat to world peace — and to an already swollen federal deficit. But while the merits of the SDI program are debatable, one thing is certain: It will be a boon for the Ada programming language, a language that has so far been relegated to the backwaters of military applications and academic research.

SDI will rely heavily on computers, and those computers will be running software written in the Ada language, a Department of Defense requirement for all of its computer systems. A massive number of Ada programs will be needed to implement SDI, creating a demand for Ada programmers and spreading knowledge of the currently little-known benefits of this obscure language.

Like the Jeep and radar, Ada is likely to migrate eventually from military uses to a position in civilian life that many will appreciate. Business users, in fact, will find Ada quite attractive.

Ada, you see, offers some features that are available with no other language. For one thing, it is highly portable; that is, it will run on various vendors' hardware. All that is needed to transport it between different makes of mainframe computers is a compiler, and the number of compilers is growing as interest in developing software for SDI heats up.

One vendor, Verdix Corp. of Chantilly, Va., makes eight Ada compilers for use with the variants of just one operating system, Unix.

Portability is important because it permits users to switch to cheaper or

See ADA page 42

Warner is editor of the Computerworld News Service.

MSA chief leads charge

Builds firm to challenge mart leaders, gain top spot

By Charles Babcock

John P. Imlay Jr., chairman and chief executive officer of Management Science America, Inc. (MSA), has led the Atlanta-based applications company from a $2.7 million-a-year supplier in 1972 to what is projected to be a $175 million-a-year company in 1986.

If the company matches that projection from Wall Street security analysts, it will have bounced back from a slow 1985, when revenue advanced only $11 million to $152 million, or 7.8% over figures from the year before. At the $175 million mark, MSA's revenue will be up 15% over 1985, and the company will be challenging the industry leaders for a top spot in 1987. At the recent MSA users group meeting in Las Vegas, Imlay paused to tell *Computerworld* why he thinks his company will face continued strong demand for its products.

INTERVIEW

MSA's Imlay

CW: Customers like your new product, Information Expert (IE), as a report writing interface to your applications. But IE is being given to your customer base. You say you spent $20 million and five years to develop it. When do you see MSA getting a return on that investment?

IMLAY: Well, we aren't marketing it as a stand-alone competitor to Focus and Ramis [development languages and data base management systems from Information Builders, Inc. and Martin Marietta Data Systems, respectively]. We were using IE as a development tool over those years. . . . We have 125 users licensing it for use with non-MSA systems for $50,000 a license, and that's more than we anticipated. We will sell Screen Painting for $50,000. But the main thing is we sell applications with it. It makes applications more attractive.

CW: You said you attracted top MIS and corporate execs to a special session this year. Why are they coming?

IMLAY: It points toward the fact that the sale is bigger, that integration is a great concern and that the total solution for these corporations is a paramount concern to the top DP person or chief information officer. . . . It's interesting that where only IBM could draw this type of crowd before,

See MSA page 40

SOFTWARE NOTES

Pitts leaves DG, moves to Cullinet

An associate of **David L. Chapman** at **Data General Corp.** has been named to a top position at **Cullinet Software, Inc.**, where Chapman is now president and CEO. **James A. Pitts** has been named executive vice-president of finance, administration and strategic planning. Pitts now serves as DG's controller. Chapman is the former executive vice-president of manufacturing at DG, and his arrival at Cullinet March 12 prompted the resignation of then-President **Robert N. Goldman.** In a similar manner, the arrival of Pitts has resulted in the resignation of **Phyllis S.**

See NOTES page 40

Rabbit reports sales agreements

By Eddy Goldberg

MALVERN, Pa. — Rabbit Software Corp., in the space of eight days, announced four sales agreements for its IBM-compatible communications and connectivity software, including one with IBM. The other three contracts are with Burroughs Corp., Tolerant Systems, Inc. and SCI Systems, Inc.

Rabbit, founded in 1982, is among a growing number of third-party vendors supplying communications and connectivity software that provides links to IBM's Systems Network Architecture (SNA). The recent deals are indicative of stepped-up efforts by non-IBM computer vendors to provide their customers with access to IBM's SNA environment.

See RABBIT page 42

NEW THIS WEEK

- AGS Management ports PAC III project management system to Microvax II
- Applied Data Research enhances ADR/Roscoe on-line programming system for MVS

For more on these and other new products, see pp. 81-104.

INSTANT ANALYSIS

"A second-half 1986 capital spending upturn may be tempered by the depressed U.S. energy sector and a slowdown in foreign computer demand. Investment strategy should emphasize services companies and avoid the capital spending-sensitive software vendors."

— Prudential-Bache Securities Research recommendation in "Software Snapshots."

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MSA chief leads charge

From page 37

software is becoming a driving force. For the first time, clients are looking to packages more than they're looking to hardware.

CW: You have committed yourselves to interface your applications to IBM's DB2 and SQL. What would happen to a company that didn't?
IMLAY: They'd lose that potential market; in the long term, they won't have a market.

CW: With new players like Cullinet Software, Inc. in the applications market, do you find that your established products like general ledger are having trouble holding their own or that they're losing ground?
IMLAY: It's just the opposite. In the past six months, because of the acceptance of our technology, we seem to be more competitive than we have ever been. And the competition has lessened as many of the competitors have been acquired or dropped out of the foray. Uccel Corp. sold off their cross-industry accounting products to a company in Denver that we just don't hear of anymore. Walker Interactive Products, Inc. has reduced its staff to virtually nothing, and we don't hear from them anymore.

Cullinet has a very loyal customer base for its data base management system, but we see great activity on the applications side with IDMS. McCormack & Dodge Corp. is still a good competitor, but the marketplace has changed tremendously.

CW: Are you seeing an upturn in sales?
IMLAY: From October on, business has been excellent. Sales were up dramatically in the first quarter, $29 million vs. $25 million. It seemed like our business picked up as the Sierra machines were installed with that excess capacity.

CW: IBM has expressed interest in increasing software revenue. Why aren't you feeling the pressure of its presence?
IMLAY: At this stage of the game, they have gone to vertical markets, in health care, in decision support and in VM software. They have formed strategic alliances, but they have stayed away from the financial marketplace. They do compete with us in manufacturing, with COPICS and MAPICS.

CW: Aren't COPICS, or Communications-Oriented Production Information and Control System, and MAPICS, or Manufacturing, Accounting and Production Information Control System, aging products?
IMLAY: Absolutely. We love it when they compete with us there. That's the only area of a competitive nature at this time.

CW: Do the independents have an advantage over IBM in some areas?
IMLAY: The sale and installation of a sophisticated accounting product takes a great deal of service. To support applications is much more difficult than to support systems products. And at the moment, we don't see IBM coming for several years.

CW: Do you see competition coming from Japan?
IMLAY: I was just in Japan. There is no indication from either the independents or the vendors themselves, like Fujitsu, that there will be any applications software products, including manufacturing systems, coming out of Japan for many years. They have a natural resistance to packages. One of them told me, "Using someone else's code is like using someone else's underwear."

CW: Do you think Japanese companies might emerge as competitors?
IMLAY: Yes. It's logical that they would. When they grasp the concept, it is their type of business. The exacting nature of software is just like the exacting nature of the development of an electronics instrument.

CW: IBM has the technical capability today.
IMLAY: Our salvation against IBM is they don't have the business-specific knowledge. The ones that do could be potential competitors, but the ones we're making strategic alliances with are the Big Eight accounting firms. They have the business knowledge. All of our systems are involved with Arthur Andersen & Co., a joint arrangement where we provide all the systems and training for their consulting people, and jointly, we bid certain total-solution jobs.

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*Data published by Computer Security Institute, 1985.

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Notes: CCA buys software firm

From page 37

Swersky, former Cullinet senior vice-president and chief financial officer.

"It is with regret we accept her resignation," said John J. Cullinane, chairman.

■

In what company officials say is a strategic move, Computer Corporation of America (CCA) has acquired Multiplications Software, Inc. of Cambridge, Mass., and its products, Imagine and Accolade, for $3.5 million. Imagine is a forms-driven, information retrieval and reporting system; Accolade is a Cobol application generator. Both will be redesigned to work with CCA's Model 204 and IBM's DB2. They currently work with IBM's VSAM and IMS. CCA officials say they will be able to offer de-

See NOTES page 42

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Source: Luther Perry, D.P. Director, Santa Cruz County, CA

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Source: Fred Lambrou, International Director of Information Services, General Foods International

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Notes: Call IBM toll free

From page 40

velopment tools for Model 204 applications and will introduce a personal computer version of Accolade compatible with the mainframe version. The PC version is expected to be released sometime this summer.

■

IBM has established a toll-free number for software and service companies that want to comarket a product or pursue some other joint agreement. The number is **1-800-IBM-VARS.**

■

New data retrieval software will be released in November by **Pansophic Systems, Inc.**, for use in information centers. Called **Query**, the internally developed software will use English language commands to enable those not familiar with programming commands to extract data from data bases.

■

VM Software, Inc. next year will release utility software to provide for operatorless backup, monitoring and batch operations of IBM's SQL/DS.

■

Applied Data Research, Inc. (ADR) and **Ashton-Tate** have agreed to provide for **direct information exchange** between ADR's Datacom/DB mainframe data base management system and Ashton-Tate's Dbase and Framework micro products. ADR will adapt its ADR/PC Datacom and personal computer-based query and report-writing facility to allow the information exchange capability.

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Rabbit reveals agreements

From page 37

IBM, too, is moving to provide connectivity among its family of computing products. The recent agreement with Rabbit gives IBM the right to market Rabbit's 3270-Plus intelligent micro-to-mainframe link for the IBM Personal Computer AT. It will be marketed as a licensed program under the IBM logo as Interactive Executive 3270-Plus.

The deal with Burroughs, announced last week, will give Burroughs direct communication links and system compatibility with IBM's SNA mainframe and minicomputer networks.

The agreement calls for Rabbit to supply Burroughs with its 3270-Plus Binary Synchronous Communications and 3270-Plus SNA terminal emulation packages, which run under Burroughs' proprietary operating system, BTOS, and Unix, and with Rabbit's RJE-Plus software for remote batch processing. The five-year deal reportedly is worth more than $5 million.

The Rabbit software will provide intelligent distributed processing capabilities for programs running on BTOS. Burroughs will install the 3270-Plus terminal emulation software on its B25 family of microcomputers and its XE 500 distributed processing systems. The RJE package will be available on the XE 550 only.

The deal with Tolerant Systems, announced a week earlier, is Rabbit's first major sale of its Peer-to-Peer Plus software, which implements IBM's LU6.2/PU2.1 Advanced Program-to-Program Communication facilities, part of IBM's SNA.

Rabbit also will supply 3270-Plus, RJE-Plus and Spooler-Plus print management software for Tolerant's Eternity series of fault-tolerant on-line transaction processing systems. The five-year deal is reportedly worth more than $3 million.

"The nature of transaction processing is that it has to link into and fit in with the customer's existing technological base," said Shirley Henry, marketing director at Tolerant.

"Since commercial data processing is dominated by IBM, and SNA is the preferred methodology, Rabbit software allows us to act as a fault-tolerant, on-line, transaction processing node within an IBM network," she said.

SCI Systems will install Rabbit's 3270-Plus package on its SCI Series 1000 and Series 2000 intelligent workstations and microcomputers, giving SCI IBM-compatible micro-to-mainframe links to SNA.

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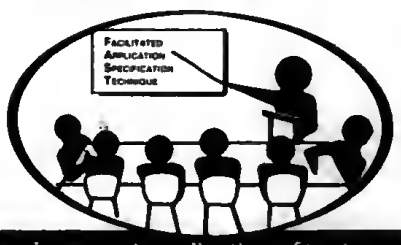

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Productivity is a way of business, not a collection of tools.

Ada gets boost from SDI

From page 37

faster hardware without a massive rewrite of their existing programs.

The DOD funded Ada's development in the 1970s because it was concerned with software life cycle costs.

A second plus for Ada is that it is designed to provide millisecond response times, something that mainframe computer users, pampered by personal computers, are now demanding.

Ada is notable, too, in that the rules for its use, while they may be many, are clearly spelled out, a quality that gives Ada the potential to eventually incorporate artificial intelligence. Those many rules, after all, may be learned by an AI program that, for example, could convert English language statements into Ada code.

With qualities such as these to recommend it and with the SDI effort to promote it, Ada is poised to take a significant share of the market in commercial programming languages, according to Verdix's director of marketing, Jack Crosby.

"The Fortune 500 companies have the same needs as the DOD," Crosby says. "As Ada begins to pay off for the government, the Fortune 500 will make Ada their language of choice."

The number of deals being made lately by Ada vendors is an indication that things may be heating up in that market. Verdix has announced a $1 million licensing agreement with Pyramid Technology Corp. under which Pyramid will gain the right to develop versions of the Verdix Ada development system for use on Pyramid Technology superminis.

Late last year, software vendor CRI, Inc. announced two packages, a data base management system and project management system, that it said were the first Ada applications for commercial use.

With the DOD gearing up for a spending effort comparable to the Manhattan Project — a program that will spend $4.8 billion on SDI research in fiscal 1987 alone — Ada use is bound to spread to the commercial sector.

After all, the last time the Pentagon sponsored the development of a computer language and then standardized on it, that language — Cobol — became the standard in the commercial sector.

SYSTEMS & PERIPHERALS

HARD TALK
James Connolly

Fault-tolerant mart matures

Once viewed as little more than an add-on peripheral — a front-end processor that made an IBM mainframe's job just a little easier — the transaction processor appears to be growing into maturity, establishing its own role in corporate computing.

Events are breaking rapidly in the transaction processing and fault-tolerant markets, and at least two traditional mainframe vendors appear to be paying heed. What vendors like IBM and NCR Corp. — as well as fault-tolerant systems manufacturers such as Tandem Computers, Inc. — seem to have noticed is that users are finding more ways to use fault-tolerant transaction processors. The market has surged beyond management of automated teller machine networks.

Among the more noteworthy recent occurences have been the following: Tandem's introduction of a new high-end system, its Nonstop VLX, which is designed to process several hundred transactions per second; NCR's commitment to transaction processing and fault-tolerant architecture in its 9800 series of systems; and IBM's positioning of its System/88 — built by Tandem's young competitor Stratus Computer, Inc. — as a host for banking and other financial terminals under IBM's Systems Network Architecture.

The on-line transaction processing market has grown steadily during the past decade, but the mart now seems positioned to soar by at least 15% per year. In conjunction with their recent announcements, Tandem and

See FAULT-TOLERANT page 44

Connolly is Computerworld's *senior editor, systems & peripherals.*

DG superminis make noise in business; Hutton listens

By Donna Raimondi

NEW YORK — The E. F. Hutton & Co. financial services firm has taken delivery of one of the first Data General Corp. MV/20000 superminicomputer systems. Both the MV/20000 and its little sister, the MV/2000DC, have started to find their way into the marketplace.

At E. F. Hutton, both systems — announced by DG in November 1985 — eventually will be added to a large number of MV/10000, MV/8000 and MV/4000 machines used for a branch information system in 400 offices around the world.

"We have a networked system tied together with a private telecom network," says Bernard A. Weinstein, vice-president responsible for communications, programming and systems.

The MV/20000, currently being tested in one of the main New York corporate data processing centers, will be joined by a number of other MV/20000s during the next year. "We are using multiple MV/10000s in some regional centers, where one MV/20000 will do," Weinstein says.

The MV/10000s will be handed down to sites where MV/8000s are straining to keep up. In turn, the 8000s will pass down to current 4000 sites, and the MV/4000s — along with some new MV/2000DCs — will go into small satellite offices or new offices.

Both of the newest DG machines have also been received by McDonnell Douglas Corp.'s Manufacturing Industry Systems Co., says Richard Rothfuss, director of marketing communications. The systems will be bundled with McDonnell Douglas Manufacturing's mechanical computer-aided design and manufacturing system, Unigraphics II, and resold. "The changes to port the software onto these new systems were negligible — we did it overnight," Rothfuss says.

Weinstein is putting the new system through its paces and likes what he finds. "We are running our normal applications on it, and it hums. We have not quantified it through performance parameters, but it is amazing how fast it goes," he says.

E. F. Hutton will not need something as big as the MV/20000 in any of its

See DG page 48

Upgrade board revs up IDM 500

Enhancements earn 38% average throughput gain

By Charles Babcock

LOS GATOS, Calif. — Britton Lee, Inc., manufacturer of hardware-based relational data base management systems, last week announced a processor board that speeds up the performance of its IDM 500 series.

Company President David L. Britton said an average of internal benchmarks indicated the new board "executes instructions up to 60% faster than our standard data base processor board."

The faster execution speed, combined with other enhancements, results in an average throughput gain of 38%, Britton said. The enhancements include the addition of cache memory, more random-access memory (RAM) and an upgraded disk channel.

"In other words, the same number of concurrent users can experience a 38% increase in performance, or you can achieve the same performance levels and add 38% more users to the network," said Britton.

The processor board and other enhancements are available for $25,000 to $35,000, depending on system configuration.

Also available as a standard feature on the IDM 500 is a mirrored disk system, which duplicates critical data bases on a redundant set of drives. The mirrored disk

See UPGRADE page 48

INSIDE

Honeywell adds a model and cuts prices of other systems in its DPS 7 lineup/44

Memorex introduces a disk cache unit and an IBM-compatible terminal/45

NEW THIS WEEK

- Hewlett-Packard adds memory cache to the controller of its 404M-byte drives

For more on this and other new products, see pp. 81-104

INSTANT ANALYSIS

"Judging from the public statements of some other executives in our industry, our very substantial gains in orders were not characteristic of the industry as a whole and therefore may not be sustained."

— NCR Corp. Chairman and President Charles E. Exley Jr.

NAS ships double-density 3380-class plug compatibles

Beats other vendors to disk system punch

By Jeffry Beeler

MOUNTAIN VIEW, Calif. — A New York-based investment banking firm recently became one of the first customers to receive plug-compatible equivalents of IBM's double-density, 3380-class disk systems.

Part of the shipment of National Advanced Systems Corp. (NAS) Model 7380-AE and -BE storage units went to Morgan Stanley, Inc., where the machines are currently being tested for reliability. Morgan Stanley officials said the drives have passed their tests thus far and that the testing is continuing.

Other disks were delivered to five user organizations representing federal and state governments, the manufacturing sector and the pharmaceuticals industry, according to Ken Page, NAS' director of peripherals marketing. NAS declined to identify specifically the 7380-AE and -BE recipients except for Morgan Stanley.

Thus far, Page said, the vendor has delivered about 40 of the units, which correspond to IBM's dual-density 3380-AE4 and -BE4.

NAS is not the industry's first supplier of double-capacity, 3380-class disk subsystems. That distinction belongs to IBM, which started shipping its AE4s and BE4s last August. But NAS does appear to be the first double-capacity disk system supplier among the plug-compatible vendors. None of the other plug-compatible manufacturers — including Amdahl Corp., Memorex Corp. and Storage Technology Corp. — is expected to deliver similar products for another three to 12 months.

NAS also succeeded in shipping its dual-density storage modules on time. When the 7380-AE and -BE were announced back in March 1985, the company promised to make the products commercially available by the end of the second quarter of this year. On April 11, the first of NAS' double-capacity disk units were delivered to Morgan Stanley, Page said.

Since then, the investment banking firm has been testing the machines extensively off-line. "We've been driving the products pretty hard, thus far without a failure," said Morgan Stanley partner Earl Kidd, who heads the firm's technical services activities. "We've put them through a couple of million I/Os a day and have wrapped them in plastic curtains to see how they would perform under high temperatures."

Kidd declined to speculate about how long the tests at Morgan Stanley would continue.

Unlike IBM's double-density 3380s, which incorporate thin-film technology, the 7380-AE and -BE use a ferrite head design that NAS claims gives them better reliability and a 27% lower cost per megabyte than their Big Blue counterparts. These claims played a key role in Morgan Stanley's decision to buy its latest external storage units from NAS rather than IBM, Kidd said.

Fault-tolerant mart matures

From page 43

NCR cited a variety of market research firms' forecasts. NCR cited the Gartner Group, Inc.'s prediction that the worldwide on-line transaction processing market will grow from $34 billion in 1986 to $53 billion in 1989. Tandem quoted Frost and Sullivan, Inc. as predicting a jump in sales from the $15.8 billion level of 1984 to $47.7 billion in 1990 and cited Dataquest, Inc. numbers showing the market as being $13 billion today but growing to $36 billion in 1990.

Tandem also quoted Frost and Sullivan as saying that while on-line transaction processing applications took up 50% of mainframe expenditures in 1984, they will use 75% of those funds in 1990. That seems to signal a shift in the market, not only with the addition of new applications but with the migration of existing applications into the on-line transaction processing environment.

Another market research group, International Data Corp. (IDC), Framingham, Mass., in conducting its annual migration study, asked DP managers about the criticality of features in system selection. More than 80% of the respondents cited 99.9% uptime as being crucial, which made it the most demanded feature, while transaction processing finished third. IDC also attributed the high demand for data base management and multiprocessing to their association with transaction processing and high availability.

On-line transaction processing has gone beyond the automated teller machine and electronic funds transfer stage. Some markets being cited by the vendors are still in that financial arena — point-of-sale support, bank branch automation support, home banking, credit authorization and securities trading.

But other applications being targeted include retail and warehouse inventory management, order processing, manufacturing shop floor, material resource planning, reservation systems and videotext.

However, a familiar ghost arose during the NCR and Tandem announcements, the haunting performance measurement question. Tandem, which long has complained about the use of millions of instructions per second (MIPS) to measure performance of transaction systems, reportedly relied on the debit and credit benchmark to establish a 40 transaction/sec. minimum rating for its basic VLX and cited an average response time of 1.5 sec.

NCR quoted a figure of 52 transaction/sec. for its current high-end 9884 model, but the company confused matters by tossing around statistics such as "4 batch MIPS" and "8 transaction MIPS." NCR also drew comparisons between its 9800 family and IBM's high-end 3090 mainframe line, a comparison that can be justified only by NCR's caveat that they were discussing transaction capabilities and not overall power.

So the on-line transaction processing market is there, and the vendors appear to be ready to address it. But the question remains whether the buyer will be able to judge one system against another.

Honeywell extends DPS 7 line, cuts prices

Entry-level mainframe user market targeted

By James Connolly

PHOENIX — Setting its sights on the entry-level mainframe user and the IBM System/38 market, Honeywell, Inc. has introduced a new model and cut prices for its DPS 7 line of medium-scale systems.

The new model is the DPS 7/40E, which the company claims will provide 25% more performance power and twice the memory at about the same cost of the previous entry-level DPS 7/35E. The DPS 7/40E replaces both the DPS 7/35E and the second-tier model DPS 7/45E. The remaining DPS 7 models, the DPS 7/55E and DPS 7/65E, received 25% price cuts.

The DPS 7/40E costs $89,000 or can be rented for $3,177 per month on a five-year lease and is available immediately. The price for the DPS 7/55E was cut from $158,800 to $120,000. The DPS 7/65E was reduced from $215,700 to $160,000. In addition, the prices of upgrades within the DPS 7 line have been cut by an average of 42%, and the price for additional 2M-byte memory modules was cut by $5,000 to $15,000.

Andre Kasberger, marketing director for the DPS 7 line, said the DPS 7/40E is targeted at new business as well as providing an upgrade path for current Honeywell Level 62 and Level 64 users. "The price and performance levels of the DPS 7/40E make it attractive in high-uptime environments, end-user solution centers and DPS 7 shops requiring the added power of a second system," Kasberger said.

Honeywell also announced its MSP4370 mass storage processor and MSU1007 for the DPS 7 line. Each MSP4370 can handle 8G bytes of data, with 1G byte stored on each MSU1007. The fixed-media subsystems operate at 1.8G byte/sec.

The subsystems will be available in the third quarter of this year at a cost of $27,000 for the MSP4370 and $34,275 for the MSU1007.

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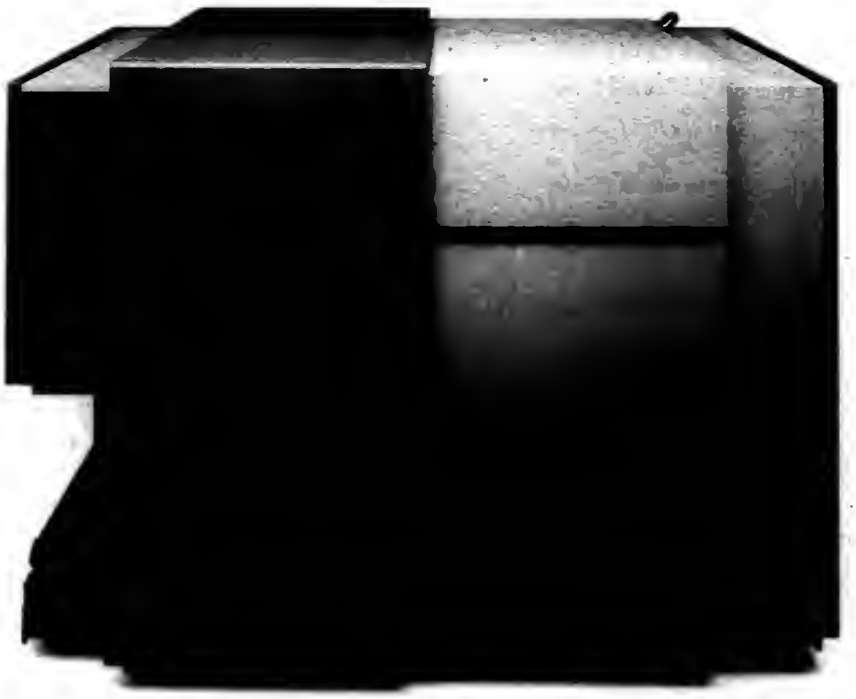

Memorex storage unit boasts greater control over cache

IBM 3270-compatible compact color display station also unveiled

By James Connolly

SANTA CLARA, Calif. — Claiming that it can provide the user with greater control over what information should be staged in cache, Memorex Corp. has announced a disk cache storage control unit for its 3680 and 6240 High Density Package (HDP) disk drives.

A Memorex spokesman said the 3888-23 cache unit lets the user select what information should be staged in cache, thus avoiding the waste in time created when other cache subsystems load cache with unnecessary records that are never referenced.

'Access time has not kept pace'

"The power of mainframe computers has increased, but the access time to on-line data sets has not kept pace. Inherent mechanical motion and rotational delays of disk drives have inhibited the increase in performance. Disk cache solves this problem," noted Memorex Vice-President for Marketing Bill Etheredge.

The 3888-23 is said to be a plug-compatible replacement for IBM's 3380 Model 23 controller and to provide an independent processor for cache management.

The Memorex unit offers from 8M to 64M bytes of cache storage using 256K-bit dynamic random-access memories. Memorex officials said that if any portion of memory fails, the 3888-23 can automatically bypass unusable memory in 48K-byte sections, allowing the cache to remain functional.

Will attach to future 3680-family drives

The 3888-23 attaches to the 3680 and 6240 HDP drives and will attach to future 3680-family drives. The 3888-23 will also attach to the double-capacity drives that the company said it will introduce later this year.

According to the company, the cache unit operates with the IBM 3090, 3080, 3030 and 4381 and with compatible mainframes.

An 8M-byte 3888-23 costs $129,400. Production shipments are scheduled for the fourth quarter of this year.

Color display station

Memorex also announced a compact, color display station for the IBM 3270 environment.

The 14-in. 2179 Display Station reportedly can display two, four or seven colors and was designed as a plug-compatible replacement for the IBM 3179 or IBM 3279 terminals.

Its modular design includes a logic module that snaps on the back of the monitor for easier maintenance and installation of enhancements. Its features include the ability to set the display's brightness, contrast, cursor and other screen functions through the keyboard.

Other features are said to include a record and playback ability for frequently used character strings, light pen support, extended highlighting and reverse video.

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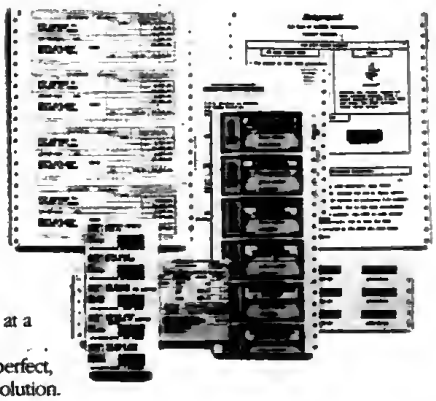

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MAI/Basic Four adds two series to MPX systems

By Rosemary Hamilton

TUSTIN, Calif. — MAI/Basic Four has added two high-end series to its MPX line of multiuser business systems. The systems began shipping this month.

The MPX Series 9000 and MPX Series 9500 run under the firm's Boss/VS operating system and are based on the company's proprietary CPU.

The Series 9000 is made up of two models, the 9010, which is based on one CPU, and the 9020, based on two processors.

Similarly, the Series 9500 is made up of three models that are differentiated by the number of processors. The low-end 9500 has one processor, and the high-end 9530 has three processors.

The Series 9000 supports up to 116 users and has a starting price of $135,000. The models come with 4M bytes of main memory, expandable to 12M bytes; 300M bytes of disk storage, expandable to 3.7G bytes; a 200 line/min printer; and one terminal.

The Series 9500 can physically support up to 255 terminals, but a more typical configuration would be 164 users. The models come with the same minimum main memory and disk storage configuration as the 9000 models. However, the 9500 models can support 5G bytes of disk storage. A typical configuration with 6M bytes of main memory; 1G byte of disk storage; two printers; five controllers, which can each support up to 16 disk drives; and 75 terminals would sell for $342,000.

Upgrades from the company's Series 7000 and 8000 to the 9000 typically involve a CPU and controller swap and cost $65,000.

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NBI supplements 500 series

Unix-based NBI 570 supports more users

By James Connolly

BOULDER, Colo. — NBI, Inc. has added another member to its 500 series family of Unix-based computers, the NBI 570, which was designed to support more users while handling larger files.

The NBI 570, based on a 16.7-MHz Motorola, Inc. 68020 microprocessor, reportedly supports four times as many users as does the NBI 510. For example, the company said it would support 100 timekeepers while providing data base and text search functionality in a typical large law firm.

NBI officials said the NBI 570 supplements NBI's Oasys cluster controllers and the company's Integrated Workstation electronic publishing system.

The NBI 570 supports from 269M to 1G bytes of disk storage and from 2M to 14M bytes of main memory. The NBI 570 will begin shipments in August with a base price of $46,990.

The company also announced its BRS/Search Full-Text Keyword Search System, an information storage and retrieval system designed for text. Also due for August shipment, it runs on the 500 series and is priced from $18,000.

DG units make noise in business

From page 43

branches, only in the regional data centers, Weinstein says. DG systems with the company's Comprehensive Electronic Office (CEO) have been installed since E. F. Hutton picked that vendor two years ago to give employees a worldwide office automation system.

"I am not an engineer, but I do know that the 20000 uses emitter-coupled logic technology, and that makes for a lot of efficiency in price/performance, which I do understand," Weinstein says. The MV/20000 has three boards, as opposed to 11 boards on the MV/10000 version that E. F. Hutton already had, so it should be more reliable, he adds. "And the operating system has been expanded to allow up to 275 CEO users, so that really raises the ceiling." In terms of size, the MV/20000 seems to be about the same size as the MV/10000 while offering twice the power for half of the cost, according to Weinstein.

All of these factors are important, Weinstein says, because E. F. Hutton has a very ambitious office automation program in progress. It is booking together 12,000 users, or two-thirds of its employees, on-line. All use will be interactive during the daytime hours, and all systems will be integrated on the same network. In addition to OA requirements, the system provides information management such as data bases and models, support for personal computing and communications functions.

One feature Weinstein is still waiting for is DG's announced AOS/DVS operating system, which would enable interconnection of various processors in a global system. The AOS/DVS, an addition to DG's 5-year-old AOS/VS, will allow transparent access of information on different processors across an entire network, says DG spokesman Greg Jarboe. The operating system is in beta test sites now and should be released generally in early June, he says.

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Upgrade board revs up IDM 500

From page 43

system was previously an option on the 500 series, Britton Lee spokesmen said.

The high-end relational machine, the IDM 500XL, has been equipped with a new SMD/E disk controller that supports transfer rates as high as 3M byte/sec., more than double the current SMD controller's current 1.2M byte/sec. rate, spokesmen said. The price of the 500XL is $139,950.

Britton Lee is offering an addition to its high-end line, the 500XLE, which includes the SMD/E disk controllers, a high-speed tape controller and Britton Lee's previously announced data base accelerator. Together, this 500XLE configuration offers a 40% improvement in average performance over the 500XL. The 500XLE comes with 2.06G bytes of mirrored disk, four 515M-byte Winchester disk drives, a 340M-byte cartridge tape drive for file archiving and 4M bytes of RAM. It sells for $199,950, company spokesmen said.

The 500XLE can be equipped with a maximum of 6M bytes of RAM, the same limit that has been in effect on the earlier models.

The 500 series machines come equipped with expansion slots that allow a user to configure them with RS-232, IEEE 488, IBM block multiplexer or Ethernet local-area network interfaces. They are designed to operate simultaneously with computers from different manufacturers, and Britton said 600 have been installed.

The repackaged low end of the line, the 500X, is equipped with 680M bytes of mirrored disk, 2M bytes of RAM, a 340M-byte cartridge tape drive for data backup and a tape controller.

Executive Report

Edited by Janet Fiderio and Becky Batcha

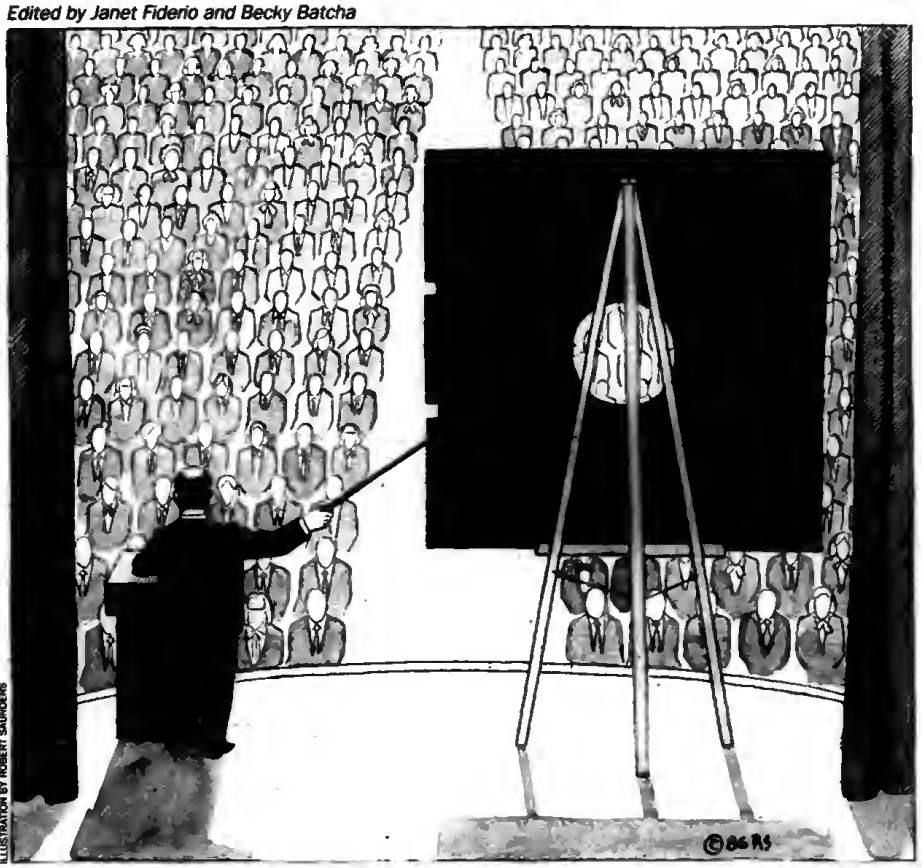

ILLUSTRATION BY ROBERT SAUNDERS

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Managing end-user training

Dedicated staff, proper tools solve instruction snags

By SHARON EFROYMSON

Training end users is a pursuit without much precedent in data processing, in that it trys to bring technical information to nontechnical people. Given the job's novelty, it comes as no surprise that most companies' training programs are currently in a phase of experimentation and change.

At this early stage of the game, every manager who is responsible for an end-user training program faces a slew of problems, each bearing on the eventual success of the program:

- Training managers need to promote their programs so as to attract potential students.
- They need to decide what types of training are most effective: classes led by instructors or those guided by computer-based training (CBT) or interactive video programs.
- They have to figure out where training should take place and how outside vendors might aid the company's program.
- As their company's program matures, these managers need to follow up on early endeavors, measure the success of various courses and export successful programs to additional corporate sites.

Of course, before individual training managers can make any decisions, companies need to decide who should manage end-user training. Top management should make sure responsibility falls on a group of people dedicated entirely to training. Dedicated trainers manage better than part-time workers in keeping courses and manuals up to date and in developing new courses that meet end users' demands.

In some cases, training becomes the responsibility of a few workers in the information center — the hub of end-user services in many corporations. When training, applications development and end-user support all take place under the same roof, the quality of training stands to gain. Consultants who work in the information center can tell trainers about quirks they discover in new releases of software packages, for example, and the trainers can pass the word on to users.

When training, applications development and end-user support all take place under the same roof, the quality of training stands to gain.

Often, however, information centers are understaffed and overloaded. Staff members cannot dedicate themselves entirely to training because they feel swamped with other responsibilities.

Fidelity Investments, a financial services

Efroymson teaches personal computer communications to corporate clients at the Center for Advanced Data Processing, Inc. in New York.

Staff, tools solve instruction snags

Continued from previous page

company in Boston, faced this problem and found a solution. Fidelity maintains more than 650 microcomputers and runs 10 internal training courses every week. Topics for the courses range from an introduction to Lotus Development Corp.'s 1-2-3 to a hands-on workshop on how to use a Cobol generator.

At first, Fidelity's information center handled all training needs, but the load became too great, according to Jim Stoudard, the firm's information center manager. "My consultants needed time to work on applications with the end user," Stoudard says, "and they didn't have the time to spend on course development."

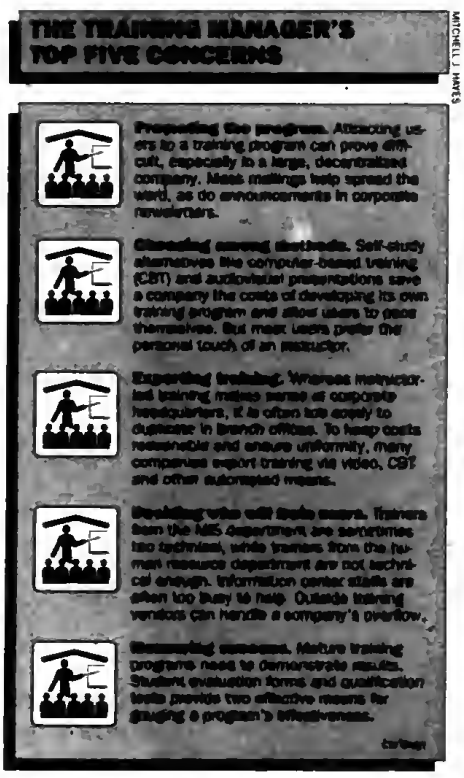
Fidelity solved the problem by dividing responsibilities between the information center and a dedicated training department. The information center took charge of all advanced courses, such as advanced macros and most data base topics, and the training group took over more basic classes.

One condition of the split was that responsibility for classes would change hands as users' sophistication increased. Whenever an advanced class became standard fare, responsibility for that class would pass over to the training department. Since the plan's inception, some fairly sophisticated classes, including an introduction to Microrim, Inc.'s R:Base, have moved under the department's jurisdiction.

Responsibility for training need not rest in an information center or a training department. Data processing and human resource departments often train users. When training comes out of MIS, however, users sometimes complain that their instructors are too technical; when it comes from the human resource department, they find that course material is not technical enough.

Because of the uncertainty about end-user training's rightful place, turf battles break out often. A financial institution that prefers to remain unnamed provides a case in point. The institution's training department has operated for a few years, yet it continues to report to both human resources and MIS. Beyond presenting political difficulties, the setup slows the training department's growth and limits its effectiveness.

Companies that want to avoid a similar snag should attempt to position their training programs under one department from the very start. If human resources and MIS both assume responsibility, neither department will abandon power without a struggle.



After a company places responsibility for training on a particular manager's shoulders, one of that person's first objectives is to entice users to register for classes. Getting the word out about new in-house training programs takes some effort, especially in a large, decentralized corporation.

At CBS Magazines, the consumer publishing division of CBS in New York, trainers generated publicity by mailing course announcements to just over 1,000 people at three locations. "We sent out a mass mailing to our entire company," says Louis Lisko, director of end-user computing for the division.

The announcement listed courses and requirements. Any user could attend, so long as he obtained his manager's approval and had a personal computer on which to practice what he would learn. As a follow-up to the mailing, Lisko placed a notice in CBS' company newsletter.

Lisko's efforts proved successful in piquing end users' interest. Of the 450 to 500 computer users at CBS Magazines, more than 100 signed on for some type of course.

In addition, the mailing provided a means of screening users before assigning them to a class. With each course announcement, Lisko's department enclosed a questionnaire that asked users to gauge their computer literacy and list their department name and other administrative information.

From users' answers, trainers could judge whether there were enough individuals in the same department or at the same literacy level to merit creating a separate class.

Lisko turned to the mass mailing and the newsletter announcement to generate interest when CBS' training program was only a few months old. Established training programs rarely require so much publicity; users tend to know computer courses exist.

In just about every company where training is voluntary, however, a block of users refuses to enroll. Ignorant users can burden an information center with their support needs, according to Fidelity Investment's Stoudard, so training managers should do all they can to keep this block as small as possible.

"The guy who says, 'I'm not going to go to class,' is the guy who calls us and says, 'I can't get my printer to work,' " Stoudard explains. He offers a handy solution for dealing with these bothersome users: "Refuse to help them until they go through class."

The training manager must also decide among competing forms of instruction. Most trainers feel that courses led by human instructors are more effective than any other type, but self-study methods like computer-based training and audiovisual presentations offer sound alternatives in specific situations.

April Allridge, a senior systems analyst at Manufacturers Hanover Trust Co. in New York, is a strong advocate of instructor-led training. When her company offered a CBT course in a fourth-generation language, people shied away, she says. "Many people have computer phobia."

Allridge currently leads a course in computer basics where five to 10 students at a time can get the initial hand-holding they need. She uses CBT materials as a supplement. "You have to start with a personal approach, so that people have a familiar face they can call with their questions," she says.

This personal approach also encourages users to take advantage of a walk-in support center that Manufacturers Hanover's training department runs. "As soon as they get to know an instructor, they'll come to the walk-in center," Allridge says.

Instructor-led courses offer another advantage over CBT in that some organizations find them easier to customize. At Fidelity Investments, for example, instructors rely heavily on real-world examples, which they use to reinforce company standards.

The company offers CBT in addition to live classes, but Stoudard sees little demand for it. "We have a dozen CBT packages in each major software package," he says, "but we always have some on the shelf." He

Continued on page 54

Expert's Opinion

Management consultant Quick

Trainers deserve leadership role

By THOMAS QUICK

Recently, a well-known management consultant angered a group of senior corporate trainers when he reminded them that they sit in leadership positions and should feel obligated to influence their organizations' strategic plans. His message was a complimentary one, but they did not want to hear it.

Many training professionals, even at high organizational levels, prefer to follow rather than lead.

These experts' reluctance causes much training and development to fall short of its potential. At the least, the training is not cost-effective; at most, it is ineffectual.

When professional trainers shy away from initiating programs, managers in MIS and other departments often determine what type of training their department will sponsor and who will receive it.

Most managers lack the professional trainer's expertise in human resource development, however. They can easily choose inappropriate kinds of training or select the wrong trainees. Of course, department managers need to assume responsibility for their employees' training. But they also need help in identifying training needs and fulfilling them.

If they choose programs without trainers' guidance and choose poorly, their organizations' products will not get made as well as they might, services will not get delivered as efficiently as they should, and costs will escalate.

With the stakes so high, managers in MIS and other divisions should insist that trainers get involved in strategic planning, yet often they do not. The reasons — or the faults — lie both with managers and with training professionals.

On the managers' side, the faults

See QUICK page 54

Quick is executive director of the Resource Strategies Institute, a training and development firm based in New York. He produces two monthly newsletters, "Professional Managing" and "Professional Selling," for the institute.

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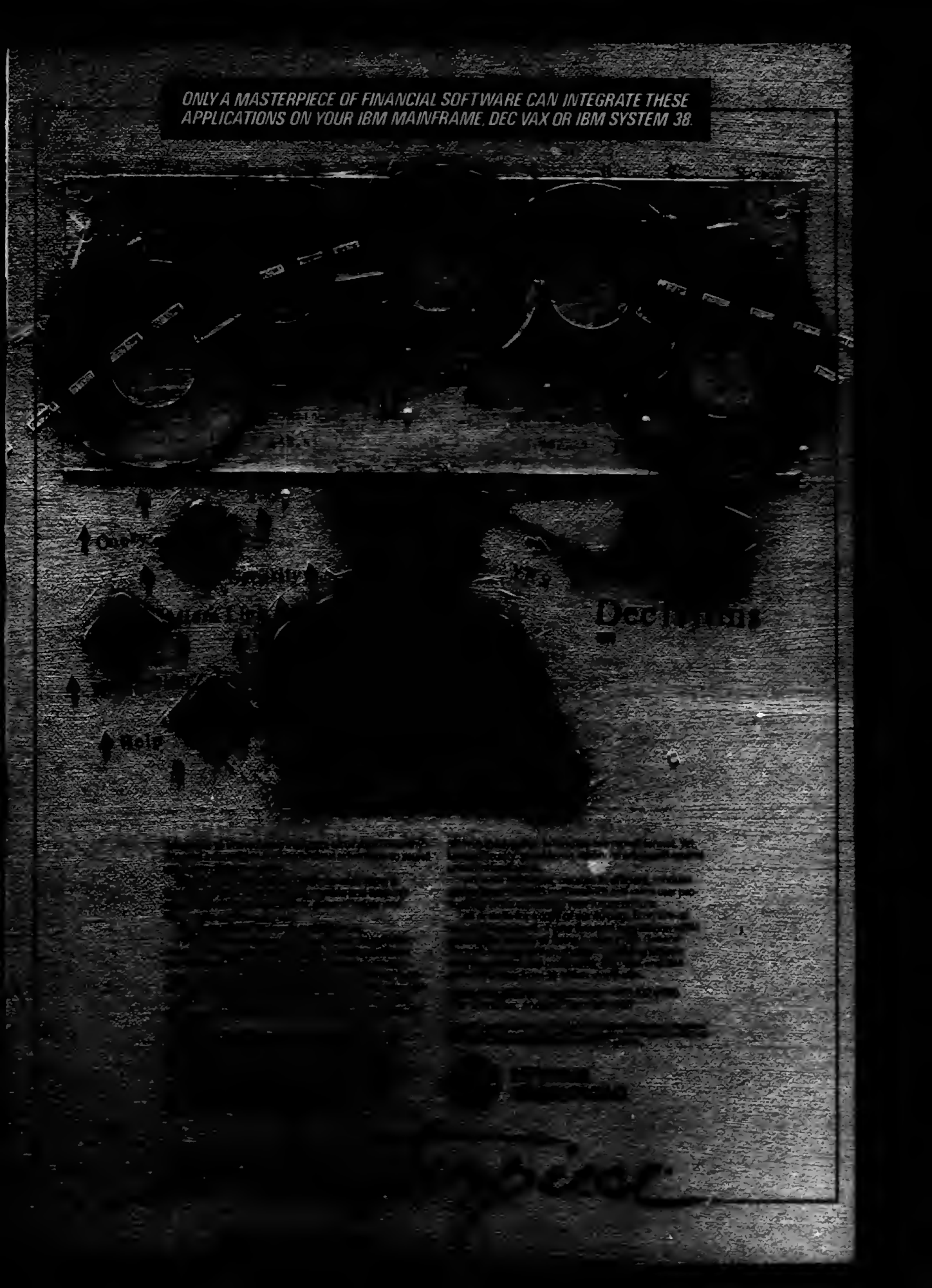

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Continued from page 50

does not know why, exactly, but says, "They do tend to be a little boring."

Fidelity's information center provides computer-based introductions to 1-2-3, DOS and Ashton-Tate Multimate, and instructors encourage students to use the programs to reinforce class work. The firm's most popular CBT course, however, is an application that teaches touch typing.

Many training managers feel that CBT deserves a more prominent place in training programs for three main reasons:

- It offers flexibility, because users can learn at their own convenience.
- It comes prepackaged and does not need to be developed in-house.

> ***Because of the uncertainty about end-user training's rightful place, turf battles break out often.***

- It is less expensive than other training media.

Managers find the last bonus especially tempting, but before they invest in CBT, they want to test its effectiveness. CBS Magazines' Lisko got the chance to do so recently, when a vendor offered to let the division work with a CBT course free for 60 days. Only members of Lisko's staff are participating in the pilot, which began in early April.

Some managers determine which training method to use primarily by comparing direct costs for classes and materials. According to this criterion, self-study programs seem inexpensive. But training itself rarely represents the most significant cost of a complete program. Students' time often costs much more. With employees' time factored in, the price of self-study rises.

Self-study methods like video and CBT are most useful in three situations:

- When people require immediate training in a new subject and the company's training staff cannot develop and deliver a course on time.

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arise from a negative view of training that becomes a self-fulfilling prophecy.

Most managers feel skeptical about the effectiveness of training, especially in "soft" areas — topics like management training where trainers claim to teach vague skills such as decision making, problem solving, planning and innovation.

Because of this skepticism, managers frequently commit themselves only partially. They approach training almost the way they might order eggs: once over lightly, and the complex training that employees require gets reduced to short classroom sessions — far too short for employees to practice their new skills.

This training accomplishes so little that it might as well have never taken place. The managers who sponsored it feel that they should have saved their money. Naturally, they had set themselves up for exactly this result.

Skepticism and halfhearted commitments often set a fad trap, in which managers fall prey to any training program that promises a quick and easy fix. When the program fails — as, of course, it will — the failure reinforces the skepticism.

Trainers themselves further bolster management's skepticism with their reluctance to take charge of strategic planning. This reluctance, which serves as a major impediment to successful training projects, comes from three sources:

Tradition. Over the years, both trainers and managers have regarded training and development as low-priority functions — a fact demonstrated in virtually every recession.

Furthermore, the training department's reporting relationships are not strong. In many hierarchies, trainers report to a director or vice-president of human resources. It is not a power track.

Credentials. The exponential growth of the training field has opened doors to many people with little background or experience.

These neophytes receive in-house training to bring them up to speed in training others. But the training is typically so highly specialized and narrowly focused that it cannot prepare the new employee to take part in top management planning.

Business competence. Many of today's entrants to the training field come from the public sector, chiefly public education. They lack a knowledge of corporate life.

After training, they may know something of their product, but they do not understand their clients' needs sufficiently. In the clients' eyes, these trainers lack credibility. They cannot talk the language, and they have trouble diagnosing problems and prescribing solutions.

At the risk of sounding simplistic, then, the situation in many organizations involves two groups — trainers and their clients — who need each other but find it difficult to communicate. To get satisfactory results out of training programs, both camps will need to move forward.

Certainly, the situation calls for an increase in professionalism among trainers and human resource developers. It also calls for a realization among managers that unless they make a genuine commitment to training they will not be as effective as they want and need to be. ■

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Executive seminars draw top managers, rally support for PCs

When the president of a major corporation requests training in an end-user application, the wise training manager does not place him in a class full of secretaries and middle managers. Most upper level executives have special training needs and want to learn with their peers.

If an MIS or information center manager satisfies executives' desires by providing special training sessions, he may derive a windfall for his own department. Executive-level seminars can alter top managers' perception of the personal computer and lay foundations for the future expansion of information systems.

Executive seminars played a large role in a plan for encouraging companywide PC use at Continental Grain Co., a multibillion-dollar international firm based in New York. Before the plan took effect, only clerical employees had used personal computers. And, according to Hilly Fuchs, director of Continental Grain's information center, middle managers were reluctant to join the ranks.

"Their reaction to the idea of using the PC was, 'What, should I become a typist?' " Fuchs says. "On the other hand, they were in a position where they didn't understand the technology used by their own staff."

The information center staff decided to skip over middle managers and target top executives, expecting acceptance to trickle down. If the plan worked, middle managers would come to feel pressure on two fronts: Both their bosses and their employees would expect them to learn about the personal computer.

The Continental Grain executive training program was conducted by an outside training firm and consisted of four half days of instruction. Classes covered minimal basic hardware considerations and introduced Lotus Development Corp.'s Symphony software package, a standard at the firm.

Other firms that offer executive training follow similar formats, although some lean more heavily toward a management slant, addressing topics like the integrity and security of data. Classroom examples tend to emphasize the personal computer's utility in "what-if" analyses and budget projections.

The general curriculum of executive seminars, however, resembles that of standard employee training programs. The main difference — and the chief reason behind the seminars' success — is the homogeneous audience.

According to Louis Lisko, director of end-user computing at CBS Magazines, the consumer publishing division of CBS in New York, "There's a comfort factor in having directors grouped with each other for training." At CBS, all employees at or above a specified rank are automatically placed into an executive class. The curriculum for the class is the same one the company uses for its introductory personal computing course.

"While executives are probably not going to utilize the product, they will need to know what the people who report to them do," Lisko says.

Grouping executives together also allows them to benefit from each other's ideas. Questions that one top manager asks tend to pertain to other top managers as well. They raise such questions more readily when they are among their peers.

If a class consists of executives exclusively, the arrangement provides a benefit for teachers as well as students. According to Colin Cuskley, director of training with the Productivity Center, a New York training firm, "The instructor can guide the discussion with questions like, 'How do you think your people will react to the program you just learned about?' " Cuskley taught the executive training seminars at Continental Grain, which met with great success.

One of Continental Grain's true achievements was its ability to attract executives to executive seminars, a difficult feat in personal computer training.

For political reasons, executives need to receive an invitation to participate from someone they consider a peer. At Continental Grain, the arrangements went smoothly because the idea for the training had originated with an executive.

Paul Cantor, vice-president of financial and administrative systems, not only initiated the seminars but also hand-chose the first participants, knowing they could make or break the effort.

Cantor also joined the class himself, thereby cementing support for the effort. Personal computer use caught on quickly. In their enthusiasm, a number of executives purchased machines without even waiting for the course to conclude.

Right now, Continental Grain's executive training program is logging yet another achievement. As planned, middle managers are beginning to call for training, citing recommendations from a boss or an assistant.

— SHARON EFROYMSON

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Survey

View from across the desk: Trainees offer tips on courses

By DAVID NEEDLE

Business users rarely agree on the merits and drawbacks of a particular micro training course, but they do hold similar opinions of classes in general. *Computerworld* uncovered three common views when it interviewed recent trainees:

• View 1: Finding the right training facility and the proper class structure is essential to success.

After three years of using an IBM Personal Computer, Marina Von Bothmer decided to take a course in advanced DOS. Von Bothmer, conference manager in the public affairs department at Citibank NA in New York, wanted to explore batch files, subdirectories and other mysteries of the PC.

Because Citibank did not offer the type of course she needed, Von Bothmer went looking on her own. After a phone call, she chose the PC Executive Training Center in New York as her school.

"I called them up and asked them to read a description of the course," she says. The description listed the commands and tasks the course would cover, and the list matched Von Bothmer's needs.

Courses at the center are a mix of lectures and hands-on training exercises, with emphasis on the latter. Von Bothmer says the approach suits her well. "I'm one of those people that if I'm not doing it, I don't understand," she says.

She also likes the ratio of students to instructor (7:1) in her class and her instructor's attitude. "I can't say I've been to a lot of different courses, but we've had in-house consultants who made me feel stupid." In contrast, instructors at the center evaluate their classes and adjust courses to their pupils' level, she says.

Von Bothmer has enrolled with the center for a number of one-day classes on different topics. She says she appreciates the short duration, noting that she typically cannot spare the time to take longer courses.

• View 2: Picking appropriate training courses is crucial because poor choices can lead to discouragement.

Christina Bonilla, a manager at Pacific Bell in San Francisco, got off to a bad start in her first computer course, an introduction to Lotus Development Corp.'s 1-2-3, because she had never used a personal computer before. "I didn't even know how to put the disk in the drive," she says, "and the course assumed you knew the basics."

Nevertheless, she perservered. After the one-day Lotus class, she tried again with a half-day introduction to the Microsoft Corp. MS-DOS operating system, which helped her feel comfortable using the IBM Personal Computer in her office. She went on to a more advanced MS-DOS class and finally to three one-day courses in 1-2-3.

The class schedule gave Bonilla a chance to work out the basics before moving on. "When I got stuck on something, I'd bring it to the next course and figure out how to do it," she says.

Two instructors taught the Lotus courses to 12 students using a combination of lectures and hands-on training, at an easygoing pace with which Bonilla felt comfortable. "It was done in a very organized way, so I was not overwhelmed," she says.

Bonilla took all of her classes from the same training company, Know How, Inc. of San Francisco, and found them all helpful. The Pacific Bell office had been disappointed with other courses from another training company whose instructors lectured too much and did not provide enough hands-on experience, according to Bonilla.

• View 3: Learning personal limitations can be as valuable as learning a specific software package.

Ronald Kilbaugh needed to learn how to program in Ashton-Tate's Dbase III — at least he thought he did.

In his job as regional production manager in charge of eight plants for W. R. Grace & Co. in West Chicago, Ill., Kilbaugh had long realized the benefits of using a personal computer. He had learned Lotus' 1-2-3 on his own and used the package regularly to help with some of his financial analysis and planning responsibilities.

But he knew he would have to spend long hours pouring over books and documentation to figure out the best way to use Dbase III, an advanced data base management program. Instead, he decided to take a one-week seminar at a summer computer institute at the University of New Hampshire.

Before long, Kilbaugh realized the topic was too advanced for him. "I was just starting in with Dbase, so the course was over my head; it was structured on a higher level. The people who had already worked with Dbase probably got a lot more out of it," he recalls.

He did learn one important lesson, however. "The course taught me I didn't have the time to take all the necessary training." Had he skipped the class and set out to explore Dbase III on his own, he says, he might have spent many months rather than a single week coming to the the conclusion that he would never master the product.

Kilbaugh took something else away from the experience. He ended up hiring the instructors from the course to do programming for his company. ■

Needle is a Menlo Park, Calif.-based free-lance writer specializing in computers and technology.

Continued from page 54

• When employees cannot spend an entire day in training.

• When the company wants to export training to remote sites that instructors cannot reach.

Whenever budgets allow, managers like to offer a variety of training media to suit users' varied needs. Bill Shannon, information center manager at Pitney Bowes, Inc. in Stamford, Conn., for example, says a mixture of instructor-led training and CBT classes provides ideal end-user education. "I think people learn in different ways," he says, and he would like to accommodate them.

Whatever medium a company chooses, its training manager and his staff will sometimes need help getting through a difficult stretch. At such times, outside training vendors offer relief.

An outside training vendor can handle overflow during heavy periods, for example, thereby easing the burden of erratic course registration patterns. A vendor can also step in and supply up-to-date instruction whenever the in-house training staff falls behind in new course development. If a training staff's time is severely limited, an outside vendor can even provide regular supplements to existing courses.

> ***In every company where training is voluntary, a block of users refuses to enroll. Ignorant users can burden an information center with their support needs so training managers should do all they can to keep this block small.***

Pitney Bowes' information center turned to an outside vendor for yet another reason — to help it survive growing pains early on, when the center's limited staff was faced with heavy demands for training.

When the personal computer population at the firm grew past 150 a year and a half ago, Pitney Bowes assigned responsibility for support and training to Joyce Woodard, a staff PC coordinator.

When she took the job, Woodard faced more than 300 outstanding applications for training. Needs seemed likely to soar even higher, because the number of personal computers in the firm continued increasing.

To cope with PC training needs, Woodard turned to an outside vendor — the company that had sold Pitney Bowes its personal computers in the first place.

To cover costs, the information center instituted a chargeback policy. Operating departments paid $65 for each student's training.

By unloading training responsibilities on an outside group, information center staff members gained time to work on user support, which Shannon considers their primary activity.

The information center is now safely past the initial crunch, having educated more than 550 end users, but Pitney Bowes continues to rely on the outside training vendor for all of the firm's PC training. Woodard has been promoted to manager of MIS education.

In-house training departments that cannot use outside training programs often have trouble juggling their teaching and course development responsibilities. In a crunch, they tend to emphasize teaching, mainly because top management measures success by the number of users trained. But this trade-off brings trouble down the line: If trainers do not allocate time to developing courses, quality will suffer.

The 3-year-old information center at the Philadelphia Savings Fund Society (PSFS), a financial institution with headquarters in Philadelphia, is currently bearing the brunt of such a trade-off.

Trainers at PSFS function as trainer/analysts: Besides teaching end users, they need to test new releases, research new technology and carry out other duties. The results are predictable.

"We're a little behind in developing courses due to the conflict in priorities in our job functions," says Susan Derrickson, one of four trainer/analysts. "If we had more time, we'd be updating our current courses, becoming more knowledgeable about the products we teach and developing more courses."

Derrickson says she would like to develop, for example, separate word processing courses for professional and clerical staff members who are currently lumped into the same class.

The information center tried to make time for course development work when it scheduled a blackout on micro training courses last September, a move intended to allow trainer Gail Heinzeroth to research and write much-needed courses in Ashton-Tate's Dbase and On-Line Software International, Inc.'s Omnilink. The month-long break proved insufficient, however. Heinzeroth finished the Omnilink course afterward, but the Dbase course remains under development.

In a more promising development, PSFS recently doubled its training staff from two trainers to four.

Office automation training includes courses in file creation, electronic mail and calendaring. Microcomputer training covers general PC literacy as well as introductory and advanced courses in 1-2-3, DOS, Multimate, Omnilink and Ashton-Tate's Dbase III.

With two trainers assigned to either area, one trainer can drop out to develop courses for a month or so while the other keeps up with training needs. Heinzeroth says quality has improved as a result.

Still, the Dbase course remains incomplete. To tide users over, Heinzeroth hands out interactive diskette tutorials. End users at PSFS can also borrow books and video courses from the information center.

Even as work continues on the Dbase course, the training staff at PSFS is forging ahead with a bold project to move successful courses

Continued on page 62

Selective shopping yields greatest training payback

'Real-world' instruction key to user satisfaction

Ideally, computer training courses should dovetail computer manuals, providing complementary information that helps users learn.

But, warns consultant Richard Riddington, "There can be a real gap between the learning environment and the real world."

Riddington, a principal with the consulting firm Soft Industries Corp. in Southington, Conn., recalls attending a microcomputer software training session in which the instructor used a great number of creative terms to help explain certain procedures.

It would have been a nice addition to the training session, but the terms appeared nowhere in the product manual, he adds.

Trainers should never "create a separate frame of reference in the training environment that you won't have when you're back at your computer," Riddington stresses.

And potential students should check to see that their instructors plan to go by the book before signing up for a class.

After taking more courses than most users and giving a good number of courses as well, Riddington feels qualified to dispense that and other tips for users who want to spend their time and training money wisely.

Richard Riddington

> "The very first thing you have to ask yourself before you sign up for a course is, 'What do I expect to get out of it?'"

"The very first thing you have to ask yourself before you sign up for a course is, 'What do I expect to get out of it?'" he says.

Course requirements differ for a person who wants to explore a field before he buys a microcomputer product and a person who has bought a product and now wants to learn to use it.

Riddington says that potential students can look for obvious clues that tip them off about a course's focus.

Students who want to learn to use a specific program, for example, should steer clear of any course that promises to cover 10 different programs.

The course won't go into depth in any one program," Riddington explains. "If you go to learn one program, then you probably will not be satisfied."

Even courses that focus on a specific program do not always supply the in-depth or hands-on instruction and experience that students expect.

Riddington once took a lackluster class in Ashton-Tate Framework II, a lecture and dicussion he describes as a hands-off seminar. The course was a disappointment to him because he had wanted to learn how to use the program.

"The hands-off course can be like an in-depth magazine review," he says. "You still don't get skills, and people don't want to pay [high course fees] for what they can get from a magazine."

Riddington also suggests that potential students check to see that the course they plan to take uses real-world examples — not just exercises — to help students memorize commands.

"We don't tend to retain info from memorization," he says, "but from such things as 'We will set up a budget' or 'We will do a P and L' that sound similar to what we do in the office."

— DAVID NEEDLE

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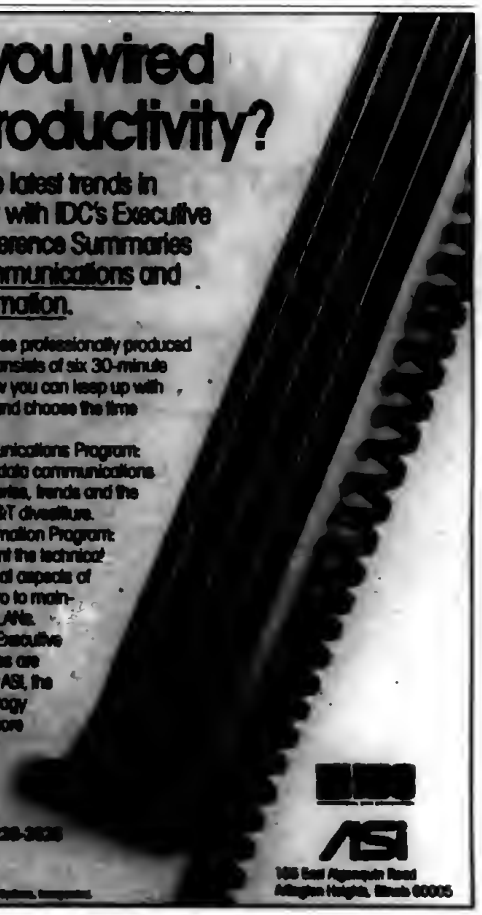

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Build or buy? Managers must weigh CBT tool options

By LARRY BRINK

End-user expectations have forced many companies to reposition training from a low- to a high-priority item.

Due to this shift, managers are paying more attention to a particular set of competing solutions — in-house development of training products vs. vendor development of training products. Both options can be appropriate solutions to training needs.

When it comes to the design and development of computer-based training (CBT) tools, however, there are several key questions managers should consider before making a decision.

CBT is a complex instructional medium — even seasoned instructional designers may have an insufficient background for dealing with it effectively. Therefore, CBT development should be approached with respect.

Whether it is done inside or outside, time, money and effort are required to create an effective training product.

The following list of considerations can help managers clarify their CBT development options:

• **Company business needs and goals.** The decision of how and where to develop CBT projects may be dependent on corporate strategies.

A corporation that plans to use a CBT program as a critical part of a major new product or service may be smarter to go outside and have the CBT training program developed rather than risk a less-than-professional first attempt at CBT.

This strategy was used by one well-known software company when it introduced its first business application.

Having spent millions of dollars on research and development and with knowledge of what it takes to compete in today's marketplace, the company decided to spend a quarter of a million more to buy a professionally designed and developed CBT tutorial.

> ***A corporation that plans to use a CBT program as a critical part of a major new product or service may be smarter to go outside and have the CBT training program developed rather than risk a less-than-professional first attempt at CBT.***

Since the stakes were so high, and since the company had little need for full-time CBT developers, the decision to go outside was smart.

On the other hand, any company that has a corporate mandate to generate significant numbers of CBT courses should consider in-house development.

Another option these companies have is to work with a vendor or a consultant initially to learn CBT basics and move gradually to create an in-house CBT development group.

Once the group is functional, outside vendors can always be used for difficult, high-visibility jobs that would stretch resources.

Companies that want to run a pilot project to examine the feasibility of the medium may also want to use the option of working cooperatively with an outside vendor.

• **CBT project schedules and budget status.** Schedules and budgets are two more elements that should be considered when making CBT development decisions.

Those companies that are inexperienced in the development of CBT projects and yet are faced with short time lines for building a major CBT program have no choice but to go outside for development.

Training vendors can staff up and get the job done quickly — although they will charge extra because of the tight schedule.

When time lines are more reasonable and controlled, however, companies can take the opportunity to hire an in-house staff to handle further CBT development.

Companies that are responsible

See BRINK page 60

Brink is a principal of Apogee Training and Development, Inc. in Newton, Mass. He has developed instruction programs using a wide variety of media, including the computer-based training format.

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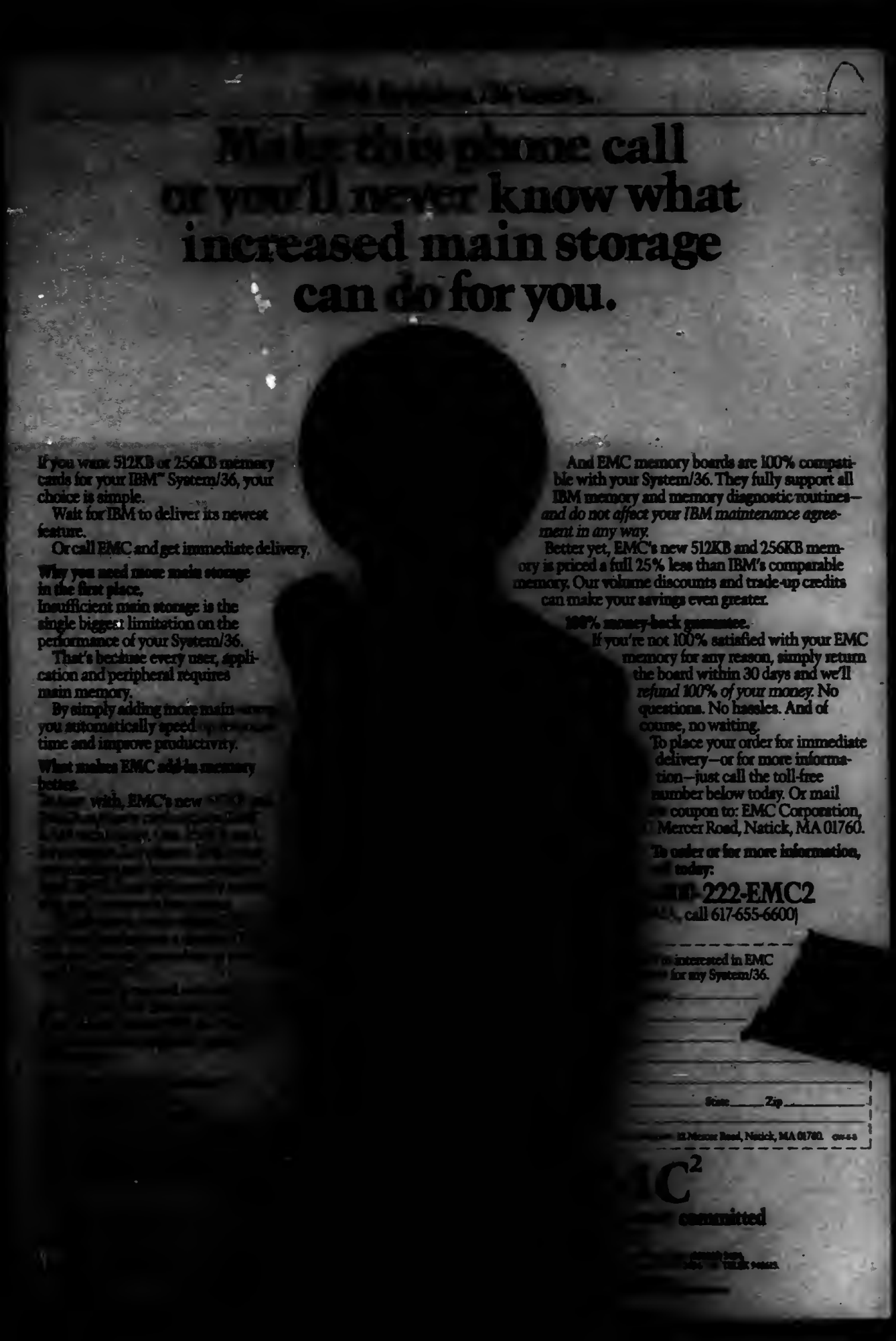

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BREAK from page 58
for multiple projects — those that run in parallel and require significant numbers of developers, support staff (data entry, quality assurance, word processing) and management control — may want to split the work load between a vendor and an in-house development staff.

In this case, it is reasonable to contract out the toughest pieces of the project and use the designs and outlines provided by the vendor to save internal design time and effort in the future.

CBT budgets often reflect corporate commitment. In effect, if a company has a short-term commitment to CBT, it is often cost-effective to use outside vendors where hardware, software (authoring tools), start-up time and hiring fees have to be considered.

For a company with a long-term commitment to CBT, it is feasible to establish an in-house group that can meet most, if not all, corporate needs.

• **Project resources.** The availability of experienced CBT developers and project managers is another consideration that should weigh heavily in in-house vs. out-of-house development decisions.

> ***CBT budgets often reflect corporate commitment. If a company has a short-term commitment to CBT, it is cost-effective to use outside vendors. For a company with a long-term commitment an in-house group can meet most, if not all, corporate needs.***

If the time and budget for an employee search is available, knowledgeable vendors, consultants and other training managers with CBT development experience can be sources of information concerning the job descriptions, requirements and competitive salaries offered to qualified candidates.

Unfortunately, due to the newness and complexity of CBT, qualified candidates for in-house positions are sometimes hard to find.

CBT development also demands that investments be made in hardware and special authoring software.

While people resources are vitally important for good program development, the technology and tools that designers need must be factored into the decision process.

The dollars for such resources are easily cost-justified when a substantial commitment to CBT development has been made by senior management.

Although there is no simple answer to the issue of in-house vs. vendor development of training materials, when managers consider immediate and long-term business plans, a sound decision can be made. ■

Humor, interactivity enhance CBT training

Student participation key to learning process

By JANET FIDERIO

Computer-based training (CBT) programs might benefit from a little fun and games. In fact, some consultants are saying that the judicious use of humor or appropriate game techniques, when combined with interactive designs, may be the deciding factor in a student's decision to stick with a training program and finish it.

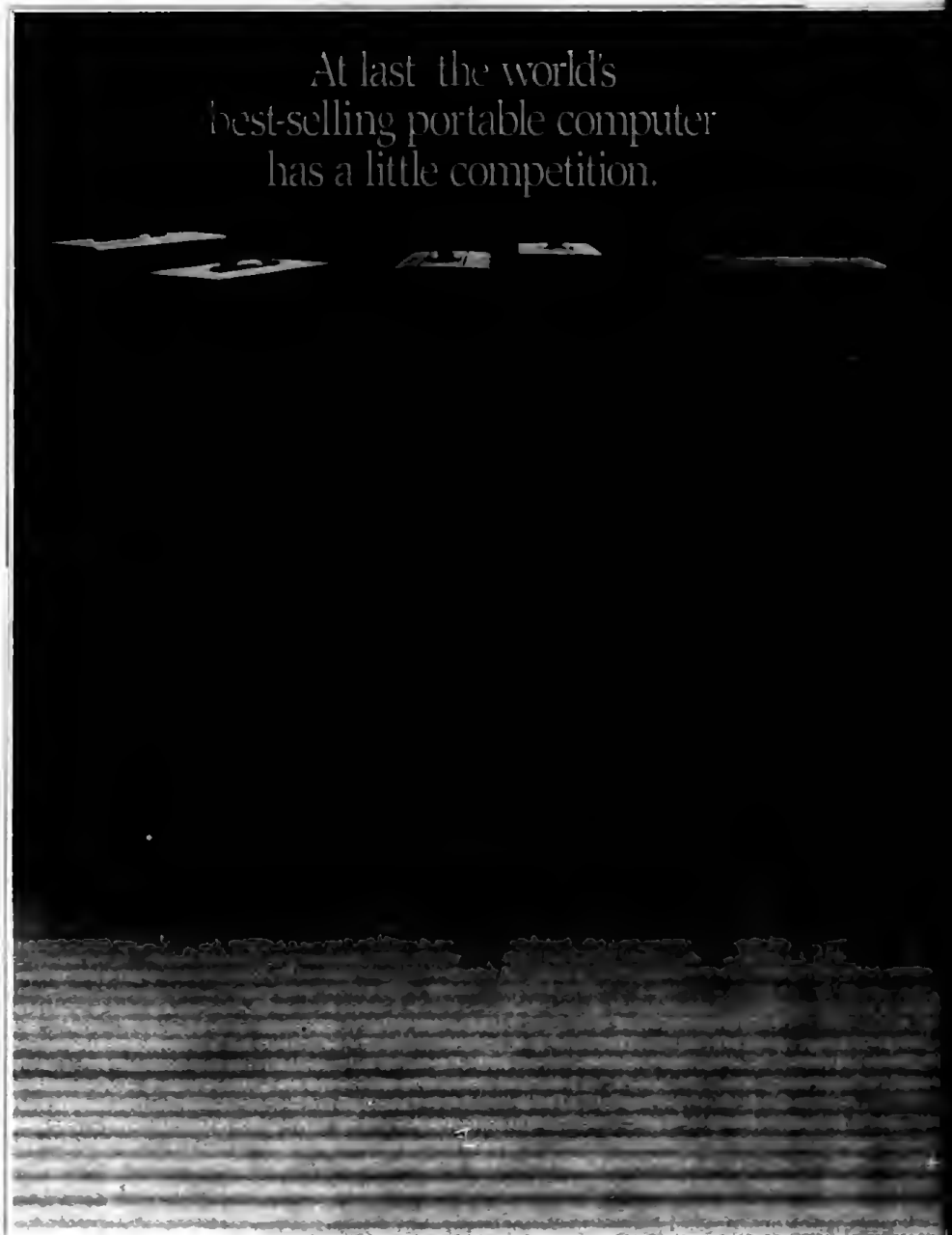
Fiderio is a Computerworld *senior editor.*

Student acceptance of CBT should be of more than academic interest to MIS and training managers because the number of CBT programs in corporate training arsenals is growing. These programs — used either as primary training techniques or as backup techniques for live or video training courses — are purchased with increased frequency because of their low price, wide availability and ease of use.

What MIS and training managers should understand before purchasing or developing CBT products in-house is what makes good CBT, or more important, what makes interesting CBT in the eyes of the student.

Consultants and training vendors are quick to emphasize the importance of interactivity in CBT designs.

They strongly discourage the use of static techniques such as simple page-turning programs, in which students are required to read page after page of electronic text. The training experts encourage the use of techniques that require the student to control or participate in the learning process, such as moving forward or backward, answering questions in a simulation or completing exercises.



Harris Sussman, a manager of special projects at Digital Equipment Corp. in Bedford, Mass., and designer of DEC's "Decision Point," a highly interactive videodisk program for management training, takes the concept of interactivity one step further.

Sussman's comments at the recent Computer Based Training Conference in San Diego reflect his philosophy that electronic-based training should be more social in nature. "A program is interactive if it gets the people who are working on it to interact with each other" he says. "But a program is very successful if it generates discussion, argument, exchange of any kind, between those people who have been exposed to it," he adds.

Sussman also advocates the use of humor in electronic learning environments. When other CBT professionals commented on humor and its importance as an ingredient in interesting CBT courseware, a variety of opinions emerged.

> ***Consultants and training vendors are quick to emphasize the importance of interactivity in CBT designs. They strongly discourage the use of static techniques such as simple page-turning programs, in which students are required to read page after page of electronic text.***

David Lichtman, president of ECA, inc., an Arleta, Calif., CBT vendor, says humor is wonderful if it aids the training process, but that it should never detract from it.

Lichtman states, "The ideal training program is one in which the students are not aware they are being trained because they are so focused on the application or the task they are learning. In that sense, the use of humor has to be very judicious, because if they are really into performing the skill, tricks are not needed to keep them involved." Lichtman feels humor might actually upset their concentration.

Marilyn Albin, principal and creative director at Micro Training Associates, Inc., a Canton, Conn.-based custom CBT development firm, concurs with Lichtman's position that humor be used judiciously, but for slightly different reasons. According to Albin, humor should be used carefully because it can trivialize the student's training experience.

She also thinks students may find some types of humor offensive. "Humor is often very regional in nature, or specific to a particular cultural or organizational group. For that reason, it is difficult to use well and in a way that is appropriate for all members of the student audience."

For Albin, games can be an effective tool in CBT design not only because they are fun for the student, but also because they can be used to demonstrate increased proficiency.

"The reason why students enjoy CBT games so much is the element of competition" she says. "The problem that holds us back from developing more games is that their design is very time consuming."

Catherine Mambretti, president of Icon Associates, Inc. an Oak Brook, Ill., computer-based training company, feels that in the ideal situation most students would prefer a little humor, and "if the subject matter lends itself to a game, it's a good way to get people to stick with the training and finish it."

She thinks that although games can be used effectively in CBT, vendors of generic off-the-shelf courseware have been hesitant to present packages that might be interpreted as frivolous to training managers who are responsible for very large budgets.

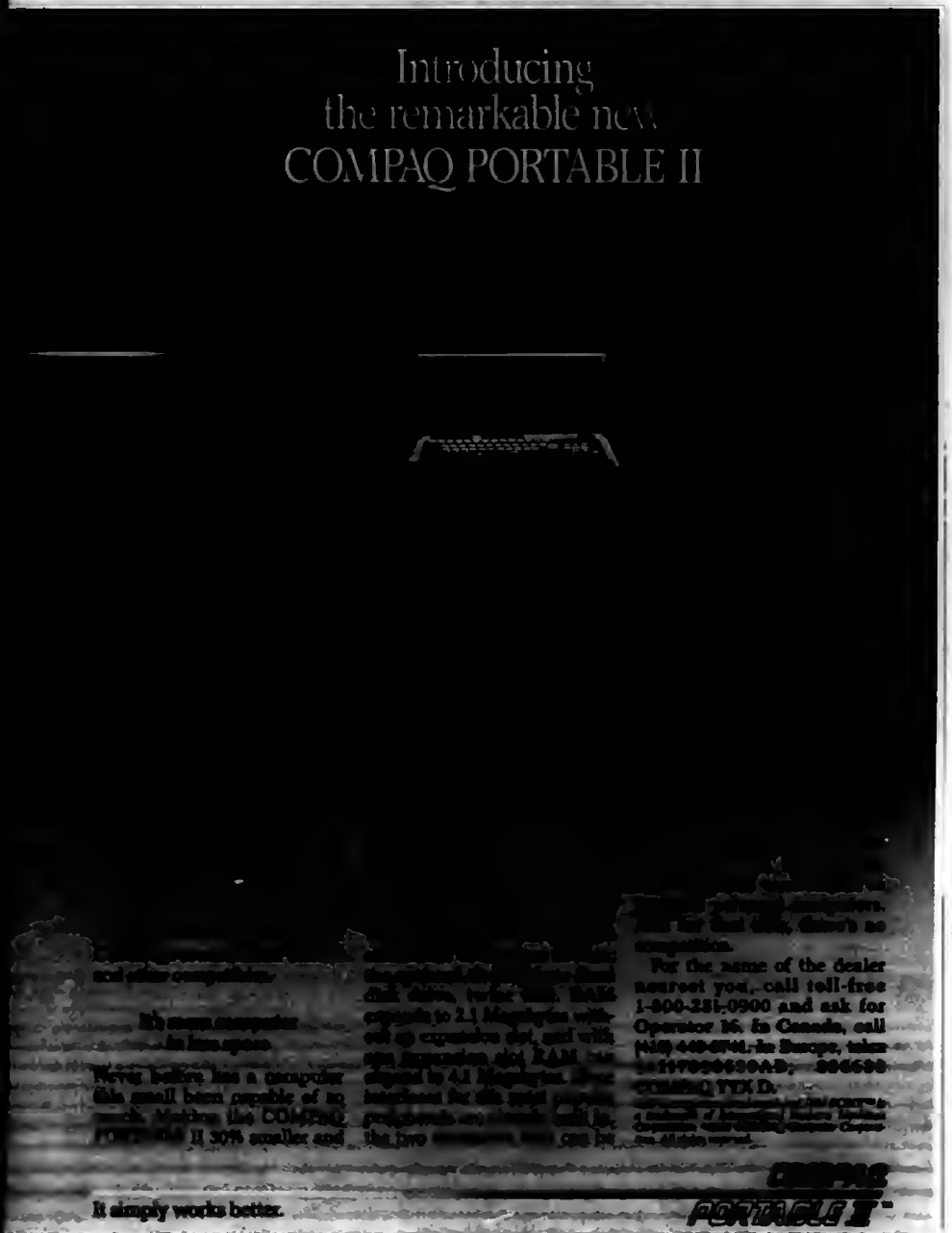
As a result, these vendors go with straight, plain vanilla instruction, because it is easier for training managers to justify to management a CBT budget that does not look like it is filled with sophisticated games — regardless of student tastes.

Mambretti suggests that managers watch for the use of voice I/O and interactive videodisk technologies in CBT.

"Traditionally, training managers have stayed away from noisy CBT — that is, courses that play music or beep and honk — because it can be disturbing to other students in a classroom situation. But there is always the use of headphones, and this kind of option humanizes CBT," Mambretti says. She feels that voice I/O could cut back on the use of static page-turning techniques.

She also thinks that interactive videodisk technology and CBT technology are destined to play an important role in electronic learning design. "When the hardware becomes more affordable, CBT is going to become interactive videodisk. They are really the same thing. The programs that drive CBT are the same programs that drive interactive videodisk."

According to Mambretti, "When people can use videotape and videodisk interactively, a great deal of interest is going to grow in the medium because we are all children of the TV." And last, but not least, the "boring screen that people sometimes get in CBT will vanish." ■



Continued from page 56

beyond the walls of the bank's Philadelphia headquarters and into about 50 branch offices throughout the country. Derrickson knows the expansion will not work without a good deal of effort.

Exporting training always presents a challenge. Because most companies cannot afford the time and expense of shipping instructors from site to site, quality control becomes difficult.

To circumvent this problem, PSFS is considering a number of options:

• One plan is to enlist a system administrator at each bank to serve as a front-line trainer and liaison to the central information center. But the branches are too small to support a dedicated trainer, and Derrickson worries that training will get lost in the administrators' other responsibilities.

• Another possibility is to send trainers from corporate headquarters to the branch offices, but Derrickson views this option as a last resort.

• A third option is to export training via CBT courses, a move that would consume little of the information center's time.

Video provides yet another option for companies that want to export their training programs outside of corporate headquarters, according to Allridge of Manufacturers Hanover.

Manufacturers Hanover exports training to extremely remote sites, usually in response to pleas for assistance from trained employees who got shipped overseas. "Whether our users are in Singapore, Hong Kong or Bombay, they want to be able to use their own terminals to access our data," Allridge says.

Because the firm cannot justify the cost of shipping its instructors around the world, it sends videotapes of those instructors, which Allridge considers the next best thing. While video is not as interactive as instructor-led training, it does supply the personal contact of a human face and voice, both lacking from CBT.

CBT courses, however, are generally less expensive than video. Moreover, they provide the opportunity to track students' performance. Metro-North Commuter Railroad in New York plans to rely on the medium to export training to mainframe users in New Haven, Conn., and Harmon, N.Y.

The firm cannot possibly provide instructor-led training at the two installations, according to Phyllis Aniello, Metro-North's training director. "There's no facility to train in, and the cities are too far away and spread out," she notes. "Plus, there is a lot of turnover, which creates a constant demand for training."

The training the railroad exports will primarily teach data entry to people who input maintenance information, recording which parts of a train need repair and when. The railroad's information center is customizing its CBT courses so trainees will learn only what they need to know. Aniello plans to track performance by compiling reports that list students and their scores.

Every training manager needs to find ways to evaluate his program. If a training program is new, evaluations help it improve; if the program is mature, they demonstrate success and keep management happy. But it is hard to isolate training from other factors that affect productivity. Evaluations require a lot of time and money.

Student evaluation forms and qualification tests provide the most practical account of a training program's success, but the popularity of a course can serve as a barometer as well.

A manager can measure the success of mainframe training courses by auditing the way employees use the system. If underutilization shows up as a trend, the training center can offer a refresher course.

The real challenge, however, lies in getting trainees to apply their newfound knowledge to their daily work. "It's one thing to learn about a product and another thing to get it to work in your environment," Aniello observes. When scores of new users are comfortable and productive with their new tools, the training manager can rest assured that his staff has succeeded. ■

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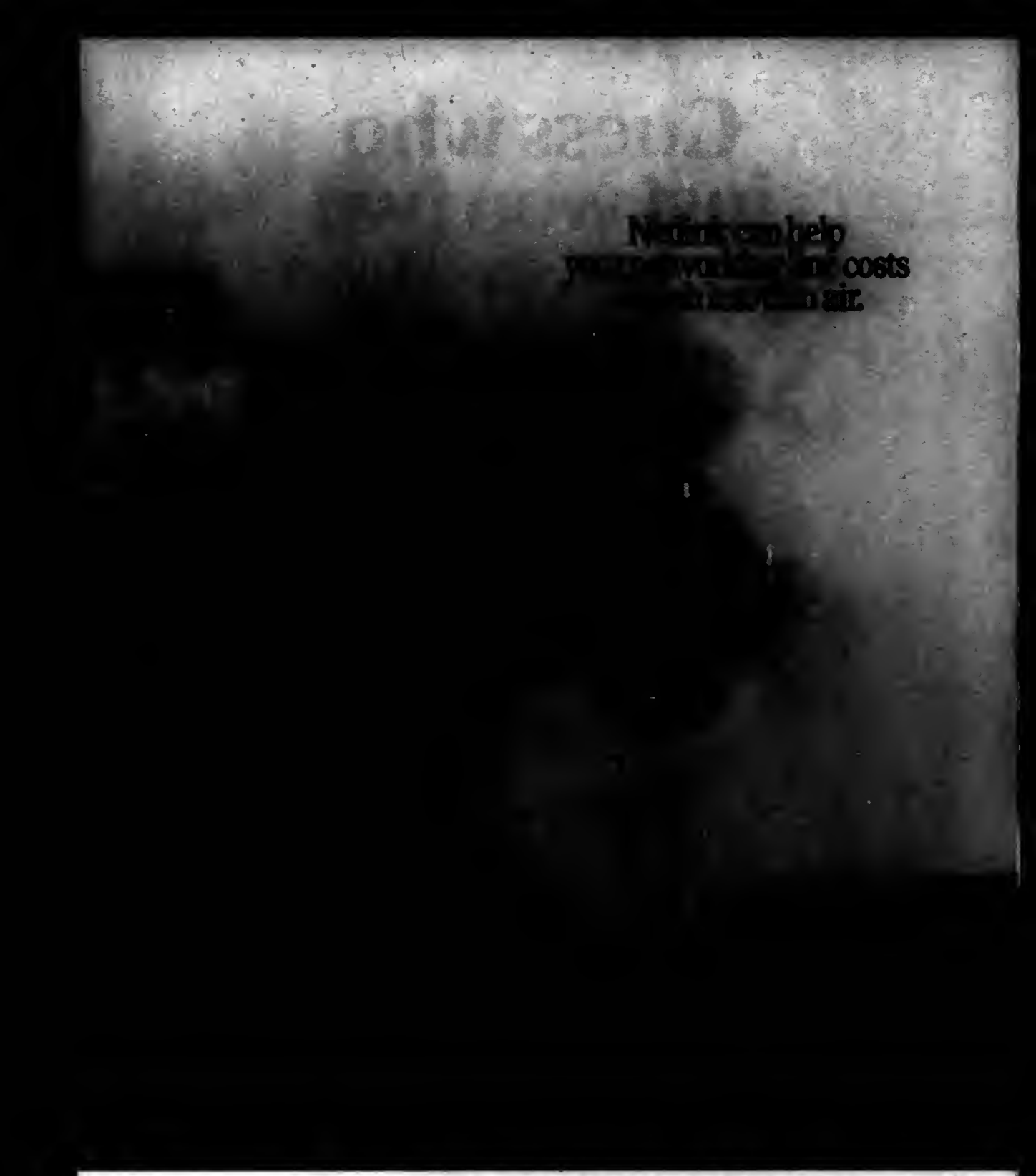

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In Depth

Upgrading proves cost-effective for immediate PC expansion

CW PHOTO BY P. CHARLES LADOUCEUR

The new AT clones tempt many users with claims of productivity increases. But upgrading installed PCs — via a broad range of upgrade options — can deliver superior compatibility and speed at much lower cost.

By T. A. ELKINS

Purchasing new IBM Personal Computer ATs or clones is one way for a company to update its personal computer equipment. This alternative yields a good degree of software compatibility, produces both real and perceived productivity increases — and expends a noteworthy amount of money. I believe that generally equal and sometimes superior compatibility and performance can be acquired at much lower cost by upgrading existing computers instead.

For one thing, the purchase-upgrade-replace sequence that many managers expect with the AT and its clones is not a likely pattern for the near future. Some history (of the Intel Corp. 80286 chip development) and some theory (about the Intel 80386) go a long way toward justifying this position.

A few naysayers will always argue against undertaking any changes to installed computers for reasons of expense or politics, but let's assume that the wide-ranging counterarguments and an appropriate management investigation have established the clear need for improvements in speed, power and efficiency. A less commonly recognized benefit is the double psychological return on investment achieved by upgrading personal computers: It prevents productive employees from feeling their work only rates outdated equipment, and it encourages these employees to believe their work is truly valued.

Unfortunately, there is no universal upgrade path, and several of the prospective paths are incompatible or wasteful if taken together. Still, much improvement can be achieved through the products marketed today.

An intrinsic side effect of upgrading existing equipment, however, will be to place new burdens upon the data processing department of the upgrading organization and to increase such organizations' necessary level of centralization.

Professor Elkins is a scholar with an ongoing research interest in advanced data encryption systems. He does management consulting in strategy and policy matters.

Specific upgrades

Where cost/performance is the controlling parameter in an upgrade decision, several simple paths are available. First, in operations where in-house programs are most commonly run in interpreted Basic, truly enormous gains can come from a software upgrade: a switch to runtime programs generated by an optimizing compiler. These compilers are often fairly costly, but only one is normally needed for every IBM Personal Computer in use to demonstrate effective speed increases of a factor of eight to perhaps 15.

For some time, Microway, Inc. of Kingston, Mass., has offered a series of Basic compilers that produce fast and nearly optimum code. In published tests, Microway claims performance improvements consistent with those given above.

Where floating-point math is a major bottleneck and where compatible or modifiable software is used, an Intel 8087 math coprocessor can yield genuine speed increases of a factor of 10 to 30. In the most fortunate circumstances, where an optimizing compiler can be combined with 8087 math coprocessors, program execution times might be reduced from 600 or 700 seconds to 4 or 5 seconds. Hardware costs for this upgrade path run between $120 and $150 per computer, even without considering the inevitable commercial discounts. Costs for optimizing compilers should be well under $1,000.

Existing Personal Computer XTs can be made slightly more productive and much more convenient with the addition of a battery-backed clock/calendar like the Dclock by Microsync, Inc. of Carrollton, Texas. This product consists of a tiny clock daughterboard that holds an Intel 8088 chip and itself plugs into the 8088's socket, giving DOS an automatic time/date setting without the loss of a slot. As a major bonus, an appendix in the Dclock manual describes an easy plug-in method of extending the XT motherboard memory to the full 640K-byte DOS limit, which saves considerable cost and of course an expansion slot. (Unfortunately, this excellent daughterboard is

not currently compatible with any of the processor replacement accelerator boards to be discussed.)

With full memory now reduced to a minor cost, it is reasonable and most productive to run XTs with disk-caching software. These programs, like Personal Computer Support Group's Lightning and Intelligent Research Ltd.'s Cache System, improve disk-access performance to an amazing degree. Not incidently, they reduce the demands on hard-disk read/write arms, perhaps extending hard-disk life expectancies. Some form of disk-caching software is highly recommended.

In conclusion, then, several low-level and inexpensive processor enhancements are commercially available. For example, the 8088 chip can be replaced with a NEC Corp. V20 for about $25. But in this case, the 8% to 15% improvement in throughput yields a poor effort/benefit payout. Unfortunately, a test of the NEC V30, the Intel 8086 replacement chip, was not possible before press time. Several replacement processors, also offering low cost but yielding low performance increases, offer one particular advantage (mentioned below) but seem unattractive in general for the demanding commercial-use environment.

> ***Where minimum system change is more important than initial expense, a plug-in hard-disk card may be desirable.***

Minimal system change

Beyond the minimum-expense additions, the IBM Personal Computer can profit most from a hard disk. In those circumstances where minimum system change is more important than initial expense, a plug-in hard-disk card may be desirable. This category of boards includes a hard disk along with its controller circuitry on the card. They need only one or 1½ expansion slots and retain both of the floppy disk drives the system usually has installed.

For example, the Hardcard from Plus Development Corp. of Milpitas, Calif., offers several advantages over hard disks. They include automatic parking, which protects the disk in the event of a nonstandard stop sequence; extremely high shock resistance, claimed to be 100Gs nonworking and 10Gs running — much higher values than most standard disks can boast; and a mean time between failures rated at 25,000 hours — more than double the industry norm.

The Hardcard is advertised as completely IBM PC compatible, and when used with the appropriate read-only memory, is fully able to boot the system if desired. This latter property is most important if convenience of operation is to be maximized. Finally, the Hardcard is rated at only about 11W, leaving open the possibility of upgrading existing PCs without installing a new power supply — a mixed blessing but a real convenience.

Express Systems, Inc. of Schaumburg, Ill., offers two hard-disk cards of its own with claimed shock resistance of 50 to 60Gs stopped and 6 to 10Gs running, a mean time between failures rated at 14,000 hours and an excellent price. One of these cards is also self-parking; both have a 20M-byte capacity. The Express System card, among others, requires a 12V connection, which is not particularly a hardship but does complicate installation.

Of more consequence, none of these cards can coexist with another hard-disk controller. Either the card must be able to run existing disks, with the expected loss of all existing data, or any existing disk must be removed from the system. In systems with existing hard disks, check carefully for this limitation; be certain to specify any existing disks when ordering.

Where cost continues to be a factor and the loss of a floppy is not viewed with alarm, a number of suppliers can provide excellent add-on hard disks. Express Systems' array of disks and controllers seems fairly complete and is attractively priced. The firm actively promotes replacing PC power supplies when the system is expanded, although the firm claims its smaller disks have sufficiently low power requirements to work with a PC

that is not loaded. (In general, I recommend against a noncard internal hard disk without a PC power supply upgrade.) Express Systems also offers a dual-floppy/dual-hard-disk, single-slot disk controller to save a slot. There are many other suppliers of good hard-disk equipment as well.

A good rule for system upgrades, unless a warranty is still in effect, would require companies to add a new, low-noise, 130W power supply with the addition of any ordinary internal hard-disk controller. With retail prices for disk, controller and power supply of less than $500 now available, a PC upgrade to hard disk should get careful consideration.

Two logical drives

Two last hard-disk points: Some disk controllers, like the DTC-5150BX from Data Technology Corp. in Santa Clara, Calif., can split one physical hard disk into two logical disk drives. This feature is both convenient and useful. It offers protection for data on one part of the disk, designated as one drive, from runaway programs writing to another part of the disk with the other drive designation. Where other features seem about equal, I strongly recommend disk-splitting controllers. For systems with disks with more than the DOS limit of 32M bytes of capacity, a disk-splitting drive or a DOS driver are a necessity.

Unfortunately, the Data Technology unit's claimed "drive-to-drive" independence is open to some question, so again, obtain a demo unit and check your specific software before you buy. And at the other end of the spectrum, some disk systems now come with software to combine two physical drives into one large logical disk if this should be needed.

Finally, hard disks that require a DOS device driver were often incompatible with commonly used software in the past and still are sometimes. Further, they can be expected to remain incompatible with many disk-caching software programs. Care in selecting such systems is strongly recommended.

Glamour upgrades

The glamour and payoff for upgrading Personal Computers and XTs come in the areas of memory and CPUs. There are currently three CPU upgrade paths I can recommend. A number of firms sell boards with a 9.54-MHz 8086 chip. The Persyst division of Emulex Corp., Costa Mesa, Calif., sells the Supercharger board. Univation, Inc. of Sunnyvale, Calif., sells the PC Turbocharger. Microway offers the original board, its Number Smasher. And naturally there are others. Each of these board designs incorporates a frequency doubler that increases the Personal Computer's clock from 4.77 MHz to 9.54 MHz. In addition, all carry at least 512K bytes of 16-bit bus memory on the board, and all offer an optional 9.54-MHz 8087 math coprocessor.

All of these products depend for their speed increases on two multiplicative factors. First, each board doubles the usual system clock, thereby effectively doubling the processor's throughput. Second, each board uses an 8086 2-byte-bus processor to replace the PC XT's single-byte-bus 8088 processor. With the processor speed doubled and with the bus bandwidth also doubled, these boards can realize a fourfold increase in a few system activities.

Because the math coprocessor only achieves a single doubling from the faster clock, the final board speed is an average of the two increases. Each of the boards listed can offer a realistic speed increase over a standard PC XT of between 150% and 180% (performance increase factors of 2.5 to 2.8). Additionally, these boards, even though dependent on the same chips and technology, offer considerable differences.

To keep costs down, the Persyst Supercharger includes only 512K bytes of memory on board — a potential shortcoming, since neither it nor any of the other boards offers much of a speed increase when working from ordinary system memory. Users will notice the speed benefits when the boards can use their own on-board memory. This limitation puts the Supercharger at a disadvantage in the moderately rare individual applications and increasingly common situations where there are multiple memory-resident applications, in which processing requires frequent access to memory

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above 512K bytes.

Nonetheless, there is a circumstance in which less than full board memory offers advantages (see below), and the cost saving realized by Persyst could be passed on to big buyers in a nicely reduced initial cost. The Persyst board also comes with no bundled software except for fast and slow software switches that the customer must program — another potential cost saving.

The Persyst board uses an unusual (if not unique) three-position speed switch. In the up position, this switch forces full processor speed; in the down position, it forces slow speed; in the middle position, the computer's speed is software controlled. Most other boards have two-position switches, fast and slow, but these speeds are affected by software routines. Finally, the Persyst board uses a daughterboard that plugs into the 8086 socket and holds the 8086 and the 8087. The heat-producing 8087 rests in the upper position on this daughterboard, so overheating of either chip seems unlikely.

Memory up to 640K-byte DOS limit

Univation and Microway both offer 128K-byte daughterboards to bring their 2-byte-bus memories up to the 640K-byte DOS limit.

Univation offers several productivity programs on disk, including a random-access memory (RAM) disk, print spooling, fast and slow software switches, several test programs and the excellent disk cache from Intelligent Research.

Microway offers all of this sort of software (either the cache program is the same or someone is guilty of copyright violation in one of the handbooks) and has a number of further test programs of considerable value.

Regrettably, the Univation board contains or can quickly develop a flaw when it accesses disks. With Satellite Software International's Word Perfect 4.1, it would not save a file, except as trash, unless the cache program was active. The board also had problems running Softlogic Solutions, Inc. Disk Optimizer, a program that organizes files on a disk such that physical and logical locations are consistent and file access is as fast as possible. The Turbocharger trashed a 10.5M-byte hard drive all the way back to the DOS format command Fdisk.

Technical support people at a Univation dealer and at Univation itself are aware of the problem, but I cannot recommend the present Univation Turbocharger.

Although the Turbocharger proved a fine product in the other respects I tested, without a firm fix for this direct memory access trouble, I cannot recommend the present model. I also fear that the 8087 is badly placed to avoid overheating problems with this board.

Smashing

Microway's established reputation in this field precedes it, but as it happened, I did have a small problem with its board. The Number Smasher has a metal end-plate that was incorrectly positioned, making the board too long to fit into the PC XT. Were the board mine, I would just bend the plate's support arms — I did try this a bit, but the distance to correct was several thirty-seconds of an inch, and a bit of bending was not enough.

I ran a quick and necessarily limited check on the board without its end-plate and it performed perfectly. Microway's board has both processor chips mounted vertically in special sockets that form two small chimneys. It is quite clear that they have devoted considerable attention to the rather important cooling issues.

> ”
>
> ***With retail prices for disk, controller and power supply of less than $500 now available, a PC upgrade to hard disk should get careful consideration.***

Of the four boards of this kind I tested, the Persyst offering seemed to have a tiny edge (a fraction of a second) in the system memory test, while the Microway board might have been an eighth of a second faster in the multiplication benchmark test. I recommend either, with the individual choice depending on the cost difference and the value to the customer of the fine Microway software and extra memory option. I do recommend that the cost of a site license for a good cache program, if one is not otherwise available, be included when considering the Persyst board. It would be silly to omit this aid.

The second accelerator type includes the Tiny Turbo by Orchid Technology of Fremont, Calif., and the Speedpac 286 from Victor Technologies, Inc. of Scotts Valley, Calif., among others. (The Victor board is available under several names.) These half-slot cards include an 8-MHz 80286 with an optional Intel 80287 and an 8K-byte, 16-bit-wide hardware memory cache. The 80286-based products are a bit less compatible with the existing software base than are the 8086-based systems, but I found no business software that they would not run.

These boards, using their 80286s, will generally not do an interweave or low-level format, for example. I am strongly opposed to software protection for line business production programs and did not test protected programs (except for Disk Optimizer) with any accelerator system. I would expect some difficulties with

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certain protection techniques.

The Orchid board has a sizable advantage over the competing boards that I know about in that it retains the original system's 8088 chip and can switch back to it at any time. This feature should provide nearly complete software compatibility, albeit with the loss of the board's performance advantage when the 8088 is active.

The Victor board has a considerable advantage of its own in that it has a jumper that can disable the on-board 8K-byte cache, increasing the board's compatibility. Disabling the cache costs dearly in lost performance, although the throughput should still be perhaps twice the original system's level and twice the level Orchid achieves when its board is switched to the 8088 mode. But while the disabled cache should substantially increase the Victor board's compatibility with general software, it would be unrealistic to expect it to equal the capability of the Orchid board in 8088 mode.

These half-slot accelerators with only cache memory offer a potential advantage in that they are surprisingly fast and they use very little power — a matter of importance in a PC without an enlarged power supply. In a very cost-conscious organization, the Victor price advantage (about $100 at retail) might outweigh the greater general software compatibility of the Orchid. But for a large organization where compatibility surfaces as the primary concern, I would expect the Tiny Turbo's extreme compatibility to earn the more common nod.

Some half-slot cards like the ones described may be available without the on-board cache memory. These boards would be significantly slower than the cards mentioned and are recommended only when they have a great cost advantage and when certain multitasking software is to be run.

Full-memory processors

The last CPU product type to be reviewed concerns the full-memory 80286 coprocessors such as Orchid's PCturbo 286E and the Pfaster286 from Phoenix Computer Products Corp. in Norwood, Mass. Both of these boards, along with others in their class, use 8-MHz 80286 processors with between 1M and 2M bytes of 16-bit-bus memory without wait states on the card. Both of these boards offer optional 80287 math coprocessors. With the intrinsically fast 80286 processors operating at 8 MHz and using a 2-byte-wide memory bus, these boards blaze!

Literature from both Phoenix and Orchid show the Pfaster286 to be about equal in speed to the PCturbo 286E. Using public information, I would expect Phoenix's board to be a good product with one particularly nice feature — it can hold two full megabytes of memory on board without a daughtercard.

The Orchid card is a truly wonderful product. Besides impressive speed at an attractive price, this board offers some striking screen updates. It would be overly dramatic to say that the first time I saw it work I thought the computer had blown up, but the fact is that the first time I watched this board perform, I thought for a fraction of a second that something inside the monitor had let go; it is truly that fast. If your need in a PC is speed, look into this Orchid board.

As is becoming common, the software for this board is transferred to hard disk or boot disk by a user-friendly install program. I hate these programs because they never do things my way, but I grudgingly admit that the Orchid install program is not just friendly, it's obsequious. I mean to coin a new term of acceptability here. This program says in plain language just what it is about and then reviews just what it has done.

These products offer some direct, concurrent operation. For example, both boards retain the original 8088 to maintain complete software compatibility. Orchid uses this chip to run a disk cache program, a RAM disk and/or a print spooler while the 80286 is doing something entirely separate. Several boards installed in

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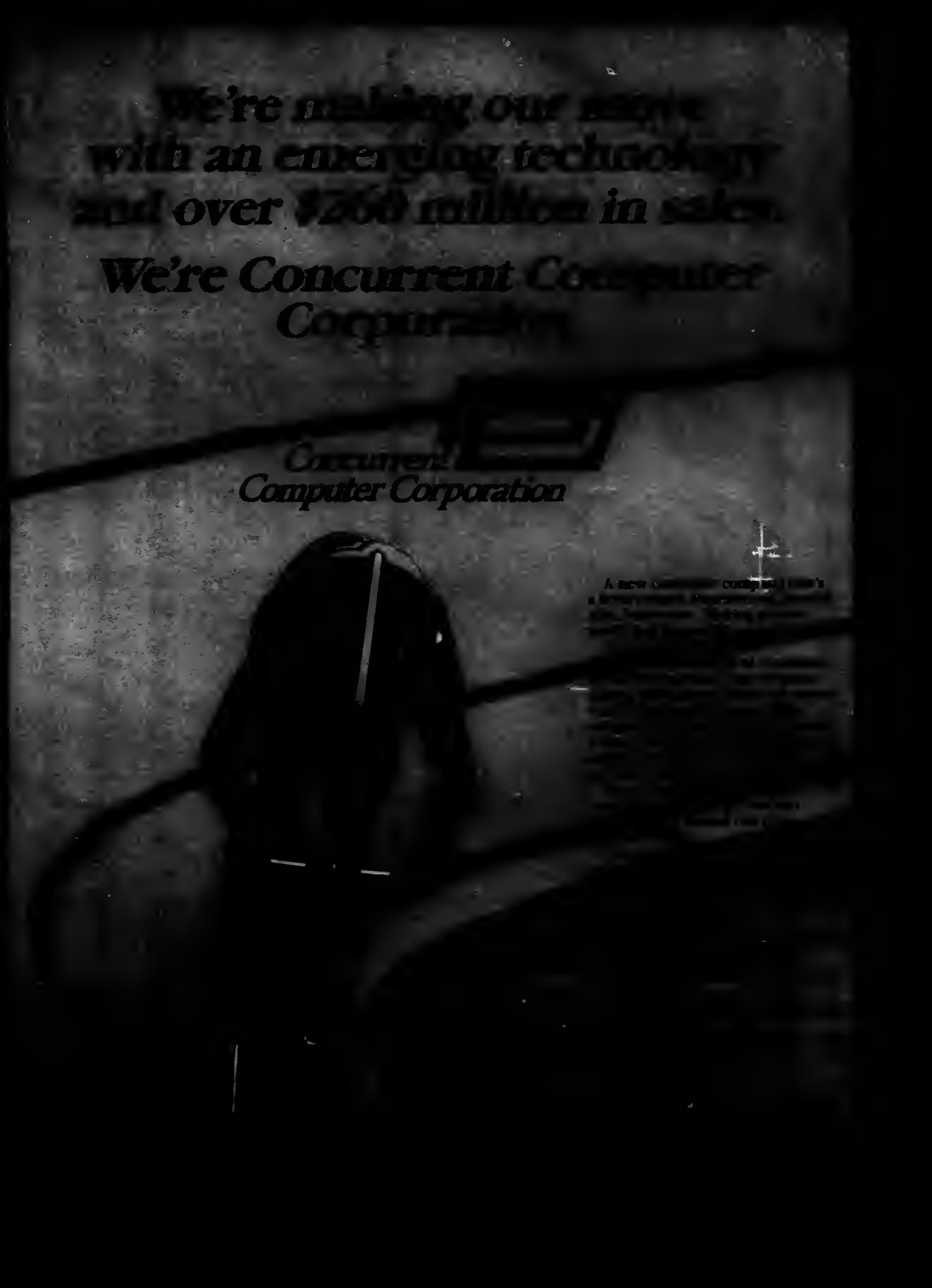
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the same computer are able, the vendor claims, to run different copies of DOS and different application programs concurrently, although I did not test this feature.

Unturbo

Orchid includes a disk cache program with the PCturbo 286E that offers two valuable advantages compared with other such programs I have examined. First, it is easily removed from memory when necessary, an ability none of the other cache programs I have seen share and a useful feature when copying programs needing verification.

Second, this disk cache program may be loaded into DOS memory, expanded memory or protected memory, when the latter two are available, at the user's option. With 1.2M bytes of disk cache, my system needs to do very few disk reads indeed. Unfortunately, this cache is not recommended with floppies, which is where the Intelligent Research cache really shines. A new version of the Intelligent Research cache can run in expanded memory, which makes it especially attractive in its own way. But take note — with some cache programs, particularly if floppies are cached, the verify program with the DOS copy function may be compromised. Unloading the cache or disabling it when copying important new software is a good idea.

> ***The first time I watched this board perform, I thought for a fraction of a second that something inside the monitor had let go; it is truly that fast.***

When the original system is needed with these boards, the command Unturbo or some equivalent returns users to DOS and the original 8088. The board loads its own copy of DOS, clean of any customized features. In this mode, the micro can run any program it had run originally, but without the accelerator's enormous speed, which I emphasize is addictive. The board's high-speed compatibility is slightly less precise than the half-slot units just discussed.

These systems are so advanced that they will violate some of the pickier software license agreements specifying single CPUs, a not insignificant concern for DP managers.

Classic Technology of San Jose, Calif., offers its 286 Speed Pak, a board that is much like the ones just discussed but that has a wait state for its memory. This board would accordingly run slower with onboard processing than the Orchid or Phoenix products. On the other hand, Classic claims to have a special BIOS implemented that accelerates disk I/O, and the company advertises a very high degree of software compatibility.

For speed demons

Once a user becomes accustomed to these boards' remarkable speeds, they do not really offer him anything more. In fact, doing nothing but increasing speed is the major design goal of these products. Except where concurrent processing is possible, compatibility with existing software and speed are the properties you pay for when you buy one of these boards.

Naturally the question must arise: Is speed enough to justify the cost? From my own experience I can answer with a rather emphatic yes. Programs like Word Perfect 4.1 too often are a bit more sophisticated and demand a bit more power than the PC environment supplies. With any of these accelerator boards, the Word Perfect screen scrolls as fast as scroll commands enter the input buffer. The system "beep" at buffer full is never heard, as it is all too frequently with a 4.77-MHz 8088. Computational programs process so much faster that I check (that is, rerun) jobs I would just accept as correct with an ordinary PC.

Several firms offer replacement motherboards that should show a nice improvement in speed, and there are at least two non-Intel coprocessor boards on the market with very fast floating-point performance figures.

Expanding memory

Memory beyond what is on the motherboard comes in three varieties. Conventional memory expansion boards are obsolete and not really recommended. The first step beyond conventional expansion lies in products like Maxit, a 256K-byte board from McGraw-Hill CCIG Software of Dallas. This board can add one or more segments to DOS, raising the system applications' limit to 704K bytes or more. In addition, it can switch-select unused space in the upper address range of the 8088 or 8086 (provided IBM's Enhanced Graphics Adapter [EGA] or other controllers have not preempted it all) yielding up to 256K bytes for memory-resident programs like Borland International, Inc.'s Sidekick, Central Point Software, Inc. PC Tools, and various vendors' Ramdisk and disk cache.

Special software can force certain of these programs into this otherwise wasted memory address range even when they are not designed to use it, leaving DOS free for applications — just as is most desirable. This board will be the answer to the prayers of a great many memory-resident program lovers and offers anyone not using expanded memory some real benefits.

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Expanded Memory Specification (EMS) changed the rules of the game where memory is concerned. It also, a bit more than incidently, introduced some of the worst and most confusing terminology imaginable into a discipline that does not need further confusion.

As a mnemonic — which you will most likely need — it is a good idea to associate expanded and paged with one another. Under the control of special programs that can use its device drivers, an EMS system pages blocks of memory larger than the 8088 and 8086 address capability — 1M byte — into this accessible range. And just to add to the fun, there is an Enhanced Expanded Memory Specification from AST/Quadram/Ashton-Tate that uses a superset of the Lotus/Intel/Microsoft specification. If this is beginning to sound like more than you really want to know about memory, skim the next paragraph.

In operation, the EMS deals in 16K-byte pages, which it switches up and down in memory from the accessible range to above it and back down into it. In the Lotus/Intel/Microsoft version, these pages are all moved through a 64K-byte window or frame located above the 640K-byte DOS limit. The AST/Quadram/Ashton-Tate version moves the pages in a much freer manner through all available even-boundary 16K-byte windows in high memory and, under the control of certain programs with certain hardware setups, through DOS memory as well.

In addition to these capabilities, a second type of device driver allows programs written to use the extended memory of an AT, not otherwise available on PCs, to run in expanded memory. You might try associating extended memory with ten twenty-four kilobytes (1,024K bytes), the address limit of the 8088 and 8086. The AST/Quadram/Ashton-Tate standard with 64 page registers is clearly superior to the Lotus/Intel/Microsoft standard of only four, but Intel makes the chips and Microsoft Corp. writes both DOS and Windows. How much hope can be held out for the new version's success on the basis of mere technical advantage?

Using more memory

So much for confusing nomenclature. In operation, an EMS board adds a few dozen seconds to the boot process as it checks itself. One or more of these boards then allows specially written programs to run in up to 8M bytes of space at 1M to 2M bytes per board. There is a four-board limit at present.

Ready, an outline processor from Living Videotext, Inc. in Mountain View, Calif., is one of the earlier programs to use the expanded memory space. Normally, this memory-resident program uses 128K bytes of DOS memory. However, if it finds an acceptable expanded memory board, it uses only 4K bytes of applications memory — the remainder of the program is stored in expanded memory. The load process is a good bit slower when expanded memory is used, and Ready's response is further slowed. But both effects are mentioned in the documentation, and for memory-resident programs neither of these two limitations is of any great importance, while the savings to DOS memory can be most important indeed.

> ***Is speed enough to justify the cost? From my own experience I can answer with a rather emphatic yes.***

Orchid's cache program will also go into expanded memory, and running a 1.2M-byte cache, as I usually do, is a joy not to be dismissed lightly.

Even when switching between three or four application programs, one disk access for each is almost always enough. When I return to a program I ran a little while before, there it is in the cache.

Microway's cache will go into expanded memory as was mentioned; unfortunately, it interferes with my hard-disk park routine, while offering only 960K bytes of storage, and is consequently less useful. With floppies, Microway's cache would be the hands-down winner.

Generally, I would say

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that these boards are currently worth their price and that their convenience and utility will grow quickly over time. Programs written to make use of their abilities are constantly being released.

Variety of memory

Again, there is a surprising difference between the available boards in this EMS category. Microway's Megapage holds up to 2M bytes of CMOS memory chips and offers low power usage. It comes bundled with the expanded memory version of the good Intelligent Research cache program. A bit surprising, however, is that Ready failed to load into expanded memory with this board. The cause of this problem could have been some action of mine — the test was necessarily short — or I suppose that a small driver difference might have introduced an incompatibility. But a clear lesson can be found here: Confirm compatibility between hardware and software before you commit to an expansion memory board.

Of perhaps more concern, when I was testing this board, the file allocation table on my E hard drive was destroyed, killing it back through Fdisk and beyond. For obvious reasons, I was reluctant to try to recreate this problem, but one possible cause of the problem occurred to me. Two attempts had been made to load a hard Ramdisk (H-Ramdisk) into extended memory on this board. If an H-Ramdisk utility failed to recognize an E drive and wrote to the file allocation tables of both the H-Ramdisk and the E drive, the observed results could easily have occurred. Another matter for careful checking in each installation. (Note: This problem was not caused by Microway's Megapage.)

Intel offers two Lotus/Intel/Microsoft extended memory boards. Its Above Board PC contains up to 2M bytes of memory. Above Board PS has a maximum of only 1.5M bytes of memory but includes a clock and two ports — much like the well-known AST Research, Inc. Six Pack. These boards must be viewed as the industry standard, and compatibility problems should be minimal.

Orchid offers two boards as well. The full-size Conquest comes with 1M byte of memory on board, a 1M-byte optional daughterboard and a networking daughterboard as an additional option. The Orchid Cramram uses special chip carriers to provide 2M bytes of pure memory in a half-slot space drawing less than 4.5W. Of importance to some, Orchid's boards are switchless and install with software that tests the current personal computer configuration, asks a few questions and does all the calculations needed to set up the boards in operation.

These boards also come with Orchid's fine expanded memory disk cache program. All of these manufacturers' boards come with Ramdisk and print spooler utilities. Note my previous caution here, however, about loading H-Ramdisks.

The AST Rampage board has a 2M-byte capacity on board, and a daughtercard can add a clock and two ports without the loss of other expansion space. It naturally conforms to the AST/Quadram/Ashton-Tate Enhanced EMS and runs Ready perfectly well. The extra value of the AST/Quadram/Ashton-Tate specification is hard to measure, but one matter will arise shortly. As is

Emulation optimizes desktop computing

By R. C. FISHER

***Terminal emulator** — something that emulates (or strives to imitate, equal or outdistance) a terminal or any device by which data can enter or leave a communications network.*

Question: Why take an intelligent, powerful, IBM Personal Computer-compatible machine and ask it to act like a stupid terminal? Answer: increased efficiency.

What if you could train your average idiotic CRT to behave like a microprocessor? That is the kind of transformation possible if one uses a PC terminal emulator in place of a (traditional) VDT. The PC acts like a terminal during interactive hours and otherwise performs independently as a fully functioning microprocessor. As the dropping cost of baseline Personal Computer machines infiltrates the realm of CRT prices, a PC purchase will yield more computing power per square foot of office space.

Thus, terminal emulators optimize the use of the most valuable form of corporate real estate: the desktops of the professionals and executives who use them.

Emulator features

Terminal emulators are software products that tie a stand-alone microprocessor into a central data base by making the microprocessor act like an interactive VDT.

The first characteristic of any emulator belongs to the terminal that the product is trying to mimic. Emulations of the IBM 3270 series terminal and the very popular Digital Equipment Corp. VT100 class are the most common. Thus, prevalent computer jargon speaks of a VT100 emulator package. Once the role model has been chosen, a microcomputer running the emulator software — with many features that can be tailored to individual needs — can often do a better job working with the user than the terminal being impersonated can.

Because an emulator has the advantage of a smart CPU sitting between the user's CRT and the host computer, keyboard characters may be translated by the PC into specific user-defined sequences, which are then sent to the host.

For example, a user might instruct his Personal Computer CPU to translate the typed input sequence CTRL P into a Purge command, sent to the host to purge all multiple versions of data residing in his file directory. Much like a simple [illegible] function, the keyboard input [illegible] results in an output of Purge — pause — [illegible]. This process of embedding keystrokes is known as [illegible] programmability.

[illegible] Confidant Systems [illegible] PC-compatible [illegible] allows users to redefine all but two of the Personal Computer function keys. When used with the control character and shift key, this ability establishes 28 local commands that can be programmed into one key. This command power is available without using any resources of the host CPU. Clearly, the workstation has become more productive without taxing the entire DP network.

Zenith Data Systems Corp.'s Zstem PC is another VT100 emulator. Zstem gives the user the ability to redefine almost the entire keyboard. Thus, in ASCII, if the host recognizes the Backspace character rather than the Delete character as the rub-out command, this will allow the Delete key to be redefined locally in the emulator. Although the letters will rarely be redefined because they are essential to meaningful communication, the keyboard, in combination with the control character, will give more than 60 reprogramming options.

Because the emulator itself must be loaded before the Personal Computer can act like a terminal, keyboard programmability allows users to tailor the hardware they use to their specific needs. For example, Teasy, from ID Systems Corp., provides a highly friendly macro function to define its alphanumeric keys as well as its control characters.

Many emulators require a control code sequence to redefine a key; Teasy provides a simple display of every available programmable key. Teasy allows users to walk through the display and simply type the new translation for that key interactively rather than send a batch-like control sequence.

Although this tailoring procedure is helpful, the start-up time can be lengthy. To circumvent this, emulators allow users to save their current keyboard configurations. Some products — again, the Teasy system is notable here — offer a menu service that can save and recall up to 10 different keyboard configurations. Hence, a Personal Computer sitting in a public terminal pool can still be made into one's own personal machine and thereby increase overall productivity.

Remote processing

Micro-to-mainframe local-area networks allow a significant portion of processing to be shared with the remote microprocessors. Thus, printing and data storage for a word processing system can be done centrally, but the actual editing can be done off-line on the local microprocessor.

All terminal emulators provide the ability to transfer files. Data can be downloaded through the emulator to the local Personal Computer for editing, and then the final product can be uploaded and stored on the host mainframe. Two important features sometimes supplement the transfer process: memory residency and preset file-transfer menus.

Memory-resident Vterm II can remain connected to the host while also granting access to the local Microsoft Corp. MS-DOS environment. Because file transfers usually travel over telephone lines, it is not uncommon for line noise to create intermittent garbage in the transmission. The memory-resident feature allows users to transfer the file and check its integrity before logging off the host. Hence, with Vterm II one can do the transfer, hit both Shift keys simultaneously to land in MS-DOS, check the file, hit the Shift keys again to bounce back to the host and then log off.

Vterm II does not require a reload when a user plans only on editing or just scanning the file for five minutes and then replacing it. It allows users to bounce back and forth between environments at their convenience, rather than the machine's.

The second important feature involves file transfer menus. Some emulators do not have any — they prompt for the file name each time a transfer is requested. A better scheme is a menu that can be preset to the file name with which a user knows he will be working. With this feature, the Personal Computer can help by knowing what is being worked on without incessantly requesting its name.

Graphics and other idiosyncracies

Care must be taken to find an emulator that understands standard graphics protocol. One cannot assume a graphics-oriented PC will act like a graphics terminal. Microsystems Co.'s Call implements an emulator that provides Regis protocol compatibility to the mainframe host. Also, ID Systems' Teasy can double as a Textronix, Inc. 4010 graphics emulator.

All of these packages — be they graphics or not — have idiosyncracies that should be examined prior to their selection for product development. Most vendors will gladly send a demonstration kit to a user facility if that facility agrees to pay return postage. This is the best advice: Users should try out the product to explore whether it has the required functionality.

Finally, for those facilities that house hardware products from more than one manufacturer, the terminal emulator option offers additional advantages. Some emulators, such as Communications Research Group's Blast, will standardize communications protocols for about 100 micro-mainframe combinations. Thus, one product can coordinate and organize access to a variety of hardware environments.

Terminal emulators provide management with greater flexibility for making hardware procurement decisions. The only systems for which they are inappropriate are critical real-time applications because users lose the speed of a terminal's firmware; it has been replaced by the portability of software. With a small cost increase, so much more computing power can be obtained with a micro network that terminal emulators can easily be said to outdistance the components they were designed to imitate. ■

Fisher is a systems security manager for a U.S. Air Force contractor in the Eastern Space and Missile Center.

standard with this version, Ramdisk, H-Ramdisk and print spooler are included. This board would be my choice for the industry standard.

If the Ready compatibility problem with Microway's Megapage proves to be a minor exception, I would wager that the combined matters of purchase price, warranty and power consumption would sway choice for a specific application. For memory pure and simple, the Cramram with its half slot and 4.35W power consumption would look very good; however, its replacement memory chips are special and could take time to obtain even if there is no premium on their price, whereas a growing list of fine additional boards can use the half slot.

In summary, then, the Cramram has major advantages in certain applications only. If a company requires the networking that the Orchid Conquest offers, the choice is easy. But if the clock and ports are more important, price and warranty matters may offer the only justification, within the expanded memory specification, for choosing one manufacturer over another.

AST Research's long experience with memory additions and its participation in the one expanded memory specification version are matters to keep in mind as well.

Finally, if a board like the Orchid 286E is used, it is most important that zero-wait state 2-byte-bus memory be added. Some of these products may be able to use EMS boards, but they will run many times faster from their own extended or expanded memories.

EMS software issues

Two programs must receive mention in the context of an expanded memory review. Windows from Microsoft and Desqview from Quarterdeck Office Systems of Santa Monica, Calif., will become ongoing facts of life for software writers and a great many users.

Because it is from Microsoft, Windows is quite likely to become a standard. This program does not use expanded memory to hold several programs in memory at the same time, as is widely believed. What it does do is provide the option of loading H-Ramdisk in expanded memory and setting Windows to swap programs from DOS memory to this virtual disk.

Also, it runs only one program at a time and requires a graphics capability on the computer for full performance.

Desqview, in contrast, needs the AST/Quadram/Ashton-Tate memory to shine. This program uses no graphics or print drivers of its own but is designed for concurrent processing.

Specific processor and memory advantages arise from the Rampage board's ability both to extend DOS memory and then to switch this extended memory with expanded memory under Desqview's control. The critical hardware issue is installed memory.

Finally, Desqview does actually switch programs up and down in expanded memory without the need of an H-Ramdisk. Under Desqview, the Persyst Supercharger leaves a 128K-byte block open for switched operation. Several sizable programs can run at once with this combination, but the programs in the upper 128K bytes of space will run at normal IBM Personal Computer speed, no faster.

Using the Victor board with its hardware cache disabled, a small motherboard memory would allow several large programs or up to nine small ones to run with one Rampage, while several Rampage boards could allow up to nine large concurrent program to run together. But beware: The processor speed, about double that of the Personal Computer, would be divided among all of these programs.

Softlogic offers an independent, low-cost program that simply switches up to 10 other active programs into and out of expanded memory space for memory-resident lovers.

Processor memory choices

Based on either the tested or claimed properties of the equipment involved, these are my choices:

If floating point were the controlling application undertaken, I would expect Microway's Number Smasher with McGraw-Hill's Maxit expansion board to offer the best speed and the highest compatibility available. I

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> ***When IBM's managers set the personal computer standard with the selection of the Intel 8088 CPU chip, they proved they had learned a lesson. While Detroit must virtually reinvent the car every three years, IBM over many years has shown a commitment to upward compatibility.***

would install a 256K-byte cache in the high memory, where speed is not critical, and use the 640K-byte option on the Number Smasher board for the number crunching. But I would not quarrel with the use of any EMS board in place of the Maxit, and if the programs were modest in size, I would not argue against using the Persyst board.

If overall speed in differing applications were most important, I would recommend the Orchid 286E with its 1M-byte daughterboard and a 512M-byte cache in old system memory. For frequent floating-point operations, I would add the 8-MHz Intel 80287.

For conditions that call for one large and several small concurrent programs to be run, I recommend the Persyst Supercharger and the AST Rampage with its bundled Desqview, but I would not object to the Number Smasher used without daughter memory.

If several large programs were to be run concurrently and if a lower level of overall performance could be tolerated, I would substitute the Victor Speedpac with its hardware cache disabled. (The nature of these hardware caches is generally incompatible with Desqview.) I would look more highly on this Victor combination if only the cache would function with Desqview. For floating-point operations in either case, I would add the 8087 or 80287. In both of these cases, I would recommend an expanded memory cache program even though it will reduce memory available to swap applications.

Unlike Detroit

When IBM's managers set the personal computer standard with the selection of the 8088, they proved they had learned a lesson. While I am told that Detroit must virtually reinvent the car every three years, IBM has shown a commitment to upward compatibility.

In the microprocessor world, from its beginning throughout the 1970s, Intel demonstrated a similar commitment. For more than a decade, Intel produced a series of microprocessors whose instruction sets were each a superset of the others. Anyone, with the wisdom of hindsight, can see the importance of this pattern. But Intel broke this pattern with the 80286 CPU chip.

The 80286 chip runs two modes. The first, which Intel calls "real," *almost* perfectly copies the functions of the 8088 and 8086 parent chips. Even with this high degree of similarity, however, incompatibilities still appear between the processors, as virtually all AT users will attest. In its second, "protected" mode, the 80286 no longer operates with an absolute instruction superset of the 8088 and 8086, and compatibility issues can become quite complex. Unfortunately, it is in the protected mode that the 80286 chip exhibits most of its advanced features. Owing heavily to this incompatibility issue, the 80286 is often an underutilized processor.

Creating the 80286 was also a hard-luck project. Perhaps Intel attempted to do too much, but the original 80286 and several subsequent modifications came into being replete with bugs in theory and in operation. Design bottlenecks restricted the chip's original performance levels, and a long series of problems severely impaired its usefulness in the protected mode.

And just now the 80386 is seeing its first silicon. I believe that Intel learned a very important set of lessons from its 80286 setbacks and failures. I also believe that

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> ***The next generation of workstations will probably not call managers in the morning to bring them up to date on overnight developments, but the generation after that just might.***

some of the people on the 80386 project have proved to be unusually gifted. The result is that the 80386 chip promises to become in reality very nearly what it has been in prospect: a giant advance in microprocessor design that still retains access to our huge existing software base.

For illustration, Intel claims 3 million to 4 million instructions per second and 1.8 million Whetstones for boards using the fastest 80386 system — performance levels from several times to scores of times better than the best that the upgraded Personal Computers can be expected to manage. While other producers of microprocessors may claim similar or superior results, none of these alternative designs are compatible with the IBM PC standard. Without compatibility, a new design is generally barred from the current software base and from practical consideration as an IBM PC replacement.

If, as I predict, Intel's design efforts are successful, the full power of the 80386 will be available in a very special "Virtual 86" mode, where most of our current software base will be able to run independently under its own copy of DOS. Using this mode, the 80386-based computer promises to act as if it had a very fast 8086 imbedded within it.

In this environment, virtual memory and concurrent system functions would lie under the control of the 80386-based hardware and its separate operating system, while the pseudoembedded 8086 would run application programs at a very high effective clock rate. Expected performance levels might generally equal that of several of our current Personal Computers running together; for numeric operations, the levels might equal those achieved by dozens of simultaneously operating contemporary PCs.

Actual compatibility in this environment will depend upon both the original programs and the new operating system for the 80386, but users might expect to see — in the next 20 to 40 months — a new personal workstation that will run most of our present software base concurrently, will yield the processor power of a minicomputer and will make obsolete just about anything in the PC field that has come before it. If the next decade's promises of large, reliable electrically erasable programmable read-only memories and read/write compact disks are fulfilled, these personal workstations will come to have megabytes and perhaps tens of megabytes of electronic nonvolatile memory and hundreds of megabytes of disk memory.

The next generation of workstations will probably not call managers on the phone in the morning to bring them up to date on overnight developments, nor will it read them the six- and 12-hour weather forecasts, but with certain software advances now brewing, the generation after that just might.

Dangerously little of this upgrade capability will be suitable for retrofitting to existing PC ATs or clones. With this limitation as a prospect, I strongly recommend upgrading existing Personal Computers and replacing them only when the next generation of equipment becomes cost-effective — possibly two years from now. I also most strongly recommend against acquisitions that cannot be amortized over the next 20 to 40 months. ■

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NEW PRODUCTS

Data Group field service tool debuts

The Small Systems Group of The Data Group Corp. located in Burlington, Mass., has announced the release of Microfieldwatch, a microcomputer-based software package designed for field service management applications.

Developed for the IBM Personal Computer AT and compatibles, Microfieldwatch is composed of two modules: Dispatch-Plus, a stand-alone module for tracking and controlling service calls of all types, and Logistics-Plus, an integrated module for tracking and controlling parts inventory.

According to a company spokesman, Microfieldwatch offers an on-line fully integrated management capability. It can be used as a stand-alone software program or packaged with a specific hardware configuration to provide a complete turnkey system.

The modules are menu driven and feature extensive on-line Help screens as well as documentation. Specifically, the Dispatch-Plus module was designed to guide the service dispatcher through all phases of the service call, including on-line call handling, assignment dispatching and real-time incident tracking.

Logistics-Plus is a closed-loop system that is said to control a company's inventory from its central warehouse to service representatives. It was designed to track parts within a spare-parts network and accommodates both internal parts movement and external parts tracking through outside sources. Logistics-Plus must be used in conjunction with Dispatch-Plus.

Microfieldwatch is priced at $4,000 for a single-user module and $7,500 per multiuser module. It comes with a service and support program that includes preinstallation consultation, hardware and software requirements evaluation and intial as well as on-going training and technical support.

Microfieldwatch is based on the same concepts as the company's Fieldwatch field service management software product for mainframe and minicomputer systems, introduced in 1980.

Lasercontrol 100 bows

Allows HP's Laserjet to emulate seven printers

Hewlett-Packard Co.'s Laserjet printer now can emulate seven other printers with Lasercontrol 100, a $150 software program introduced last month by Insight Development Corp. of Moraga, Calif.

Currently distributed by HP's Direct Marketing Division, Lasercontrol's printer emulation facility provides compatibility between the Laserjet and all IBM Personal Computer software applications programs, according to Insight. These software packages need not specifically support the Laserjet.

Lasercontrol emulates Qume Corp.'s Sprint, NEC Information Systems, Inc.'s 3550, 5510 and 7710, Xerox Corp.'s Diablo 630, Epson America Corp.'s MX-80 and IBM Graphics printers.

Besides printer emulation, Lasercontrol provides menu-driven control of the Laserjet, replacing the need to use complex escape code sequences, the vendor said.

The menu is provided as both a standard IBM PC-DOS application or as a memory-resident program that can be accessed by pressing Shift-Prsc. Both versions of Lasercontrol are provided on the disk.

The menus allow the Laserjet user to set character spacing, margins, number of lines and pages, font cartridge, page orientation (horizontal or vertical) and type style (point, font and pitch).

In addition, the menus let users redirect printer output to another printer or turn the Laserjet into a copy machine that can print up to 99 copies of each page.

Lasercontrol runs on IBM PC, Personal Computer XT, AT and compatible machines with a minimum of 128K bytes of random-access memory and is not copy protected.

The program supports both the Laserjet and Laserjet Plus printers.

INSIDE

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Borland unveils Reflex upgrade, Sidekick version for Mac Plus

Borland International, Inc. of Scotts Valley, Calif., has enhanced its Sidekick for the Macintosh to support Apple Computer, Inc.'s Macintosh Plus.

The new version supports the Macintosh Plus' expanded read-only memory and Finder 5.1 system software.

New features include an enlarged and field-sortable Phonebook, autodialing through a modem with either tone or pulse dialing and data transfer from the Phonebook feature to the Macintosh Clipboard.

It also includes an option for a column for dollars and cents in the Quiksheets feature and support for the Epson Corp. family of dot matrix printers and the Thinkjet from Hewlett-Packard Co.

Borland also recently announced an upgrade of Reflex, the Analyst, a relational data base management program that runs on IBM Personal Computers and compatible systems.

The upgrade reportedly includes support for expanded memory under the Lotus/Intel/Microsoft Expanded Memory Specification or AST/Quadram/Ashton-Tate Enhanced Expanded Memory Specification.

Version 1.1 also supports as many as 32,500 records in memory and 250 fields, compared with the 16,000 records and 128 fields permitted under Version 1.

Updates are available from Borland for $10.

The update is available for $19.95 for registered Sidekick owners who bought the product before Dec. 15, 1985.

Registered owners who bought after that date will receive the upgrade and new documentation free of charge.

Registered users who have not purchased Borland's Phonelink communications accessory can get the update with Phonelink for $29.95.

Sidekick for the Macintosh with Phonelink is priced at $99.95.

Concerto line enhanced

Leblond products tune up Symphony

Adding to its Concerto family of products designed to allow users to create add-ins for Lotus Development Corp.'s Symphony software, Leblond Software, Inc. of Indianapolis recently introduced $99 versions of Concerto for IBM's Compiled Basic and Borland International, Inc.'s Turbo Pascal.

Symphony add-ins are programs that attach to Symphony and become an integral part of it. They can either enhance Symphony's current functionality or provide links to other programs or computer systems. Concerto products allow developers to design add-ins using high-level programming languages rather than assembly language.

According to a company spokesman, Concerto's high-level language allows users to take advantage of Symphony's built-in hooks.

Basic Concerto, released last September, allows developers to use Interpreted Basic to design Symphony add-ins. Compiled Basic Concerto lets developers use Microsoft Corp.'s Quickbasic Compiler or IBM's Basic Compiler Version 2. Pascal Concerto works with Borland's Turbo Pascal.

Leblond also is designing software to run with Lotus' 1-2-3. Leblond will offer Concerto versions for 1-2-3 in the same languages offered for Symphony, with products expected later this year.

General Parametrics' Videoshow gets presentation software, printer

General Parametrics Corp. of Berkeley, Calif., has announced two products designed to enhance the capabilities of Videoshow, its microcomputer-based presentation system.

The first product is a version of Freelance, a presentation software product from Graphic Communications, Inc., and the second is the Xerox 4020 Color Ink Jet Printer from Xerox Corp.

Freelance for Videoshow features a symbol library with almost 400 symbols and images as well as draw capability. According to a company spokesman, Freelance allows the presenter to produce not only professional-quality business graphics but custom images such as logos as well.

The Xerox 4020 Color Ink Jet Printer provides Videoshow users with color output for reprints, handouts and color transparencies.

Freelance for Videoshow is priced at $395. The Xerox 4020 Color Ink Jet Printer costs $1,495.

According to the vendor, the Videoshow product line of hardware and software is a complete business presentation system, offering output options in different media from video to slides to hard copy.

Videoshow products utilize a proprietary technology developed by General Parametrics, said to enable them to use 1,000 colors on the screen and to display high-resolution images.

SOFTWARE & SERVICES

Systems software

Applied Data Research, Inc. has enhanced its **ADR/Roscoe** on-line programming system to be used in MVS environments.

New features in the Roscoe Programming Facility (RPF) permit internal subroutines and allow direct reading of Roscoe library members into RPF variables. Multiple Roscoe commands can now be saved as they are executed, listed and recalled to allow changes and re-execution.

Other features include extensions to the Response Time Monitor and enhanced capabilities in the communications facility. Also the Extended Time Sharing option has been enhanced.

Roscoe costs $60,400.

Applied Data Research, CN-8, Rt. 206 & Orchard Road, Princeton, N.J. 08540.

Applications packages

The Acme Computer Co. has ported its **Linear Optimizer** general-purpose linear programming package for personal computers to the Plexus Computers, Inc. family of supermicros under Unix System V.

The package consists of an integrated matrix generator said to accept a formula-oriented matrix generation language, including features such as read and write statements and conditional expressions; a solution procedure, which is a primal or dual simplex algorithm operating on a sparse matrix representation; and a report writer.

Linear Optimizer is priced at $1,000.

Acme Computer, P.O. Box 51193, Seattle, Wash. 98115.

■

AGS Management Systems, Inc. has ported its **PAC III** project management system to the Digital Equipment Corp. Microvax II.

PAC III is said to be capable of handling projects with many thousands of activities, resources and network relationships, including software engineering, the design of electronic components and development of drug compounds.

Previously PAC III was available on large mainframes from IBM and DEC.

PAC III is priced at $30,000. Plotter software for drawing wall-size network and bar charts and color graphics software are available for $4,000 each.

AGS Management Systems, 880 First Ave., King of Prussia, Pa. 19406.

■

Gateway Design Automation Corp. has introduced **Stafsim**, a statistical fault analysis software package said to provide digital circuit coverage as well as a logic simulator.

Stafsim covers potential circuit faults, including those that occur at the inputs of circuit elements. It offers interactive logic simulation and primitives for functional, gate and switch-level simulation.

Stafsim was designed to be machine independent. Versions are currently available for Digital Equipment Corp. VAX, Apollo Computer, Inc., Sun Microsystems, Inc. and IBM mainframes. Price ranges from $5,000 to $20,000 per machine.

Gateway Design Automation, P.O. Box 1545, 235 Great Road, Littleton, Mass. 01460.

Training software

Computer Systems Research, Inc. has introduced a new version of its **self-study, computer-aided instruction courseware** package, designed to teach the fundamentals and use of IBM's JES3 operating system.

According to a company spokesman, the package has been expanded from 39 to 42 lessons and includes more examples and questions as well as expanded information.

It runs on either an IBM Personal Computer equipped with the vendor's Trainer 4000 Presentation System or on a mainframe that utilizes IBM's Interactive Instructional System.

The package is priced at $1,500 per course.

Computer Systems Research, P.O. Box 45, Avon Park S., Avon, Conn. 06001.

Services

Compuserve, Inc. has added access to an additional 700 data bases through its **Compuserve Information Service.**

The data bases are made available to subscribers through Iquest, a gateway service developed by Compuserve and Telebase Systems, Inc. Subjects range from business and technology to humanities and social sciences.

The data bases fall into two categories: full text and bibliographic. Searching a full-text data base provides up to 15 titles per search. Bibliographic data bases show up to 10 citations per search.

Subscribers pay $7 per search in addition to connect charges of $12.60 per hour during business hours and $6 per hour during nonbusiness hours.

Compuserve, P.O. Box 20212, 5000 Arlington Centre Blvd., Columbus, Ohio 43220.

MICROCOMPUTERS

Software applications packages

McDonnell Douglas Information Systems Group has unveiled **FM/PC**, a facility management software system for the IBM Personal Computer.

The system, developed by Re-

Continued on page 84

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NEW PRODUCTS/MICROCOMPUTERS

Continued from page 82

source Dynamics, Inc., operates in conjunction with the McDonnell Douglas computer-aided design product, Graphics Design System. It includes a relational data base and five facility planning functions: inventory, forecasting, affinity optimization, stack planning and lease management.

FM/PC is priced at $19,000.

McDonnell Douglas, P.O. Box 516, St. Louis, Mo. 63166.

■

McDonnell Douglas Communications Industry Systems Co. has announced **Microcube**, personal computer software for financial planning.

Designed for use on IBM PC-DOS- and Microsoft Corp. MS-DOS-compatible systems, Microcube is a fully integrated system for organizational modeling and business planning.

It offers a spreadsheet that organizes data into rows, columns and pages. The product can spread a year-end forecast over the months of a given year. It color codes values that have been input, locked, recalculated or left unchanged.

Microcube costs $1,200.

McDonnell Douglas, Suite 200, 7535 E. Hampden Ave., Denver, Colo. 80231.

■

American Business Computer Development Systems, Inc. has ported its **Workstation Basic** programming environment to the Santa Cruz Operation, Inc. Xenix operating system.

The Xenix version provides a consistent DOS-like format. It allows program changes and debugging while in execution, according to the vendor.

All Workstation Basic versions feature full screen entry with color support, unlimited file size, integrated index support and file sharing with record locking.

Prices for the programming environment range from $600 for a one- to four-user run version to $2,000 for a 14- to 19-user full version.

American Business Computer Development Systems, Suite 40, 2489 Rice St., Saint Paul, Minn. 55113.

Jandel Scientific has announced **Sigma Plot**, a software package designed to create publication-quality graphs and charts for scientists.

Sigma Plot features the ability to produce scatter, line, histogram, bar and grouped-bar charts with one- or two-way standard deviation, standard error of the mean and 95% or 99% confidence interval error bars.

Sigma Plot runs on the IBM Personal Computer, Personal Computer AT, XT or compatibles and Hewlett-Packard Co. or compatible plotters. It costs $350.

Jandel Scientific, 2656 Bridgeway, Sausalito, Calif. 94965

■

Tominy, Inc. has introduced the **Mach 1 Professional Application Developer** (PAD) for IBM PC-DOS and compatible computers.

Mach 1 Pad is a single-user system generation facility. It includes a relational/network/hierarchical data base management system, fourth-generation programming language, application program generator, automatic screen editor, report generator, system utilities and flexible query.

Other features include data base definition and creation utilities, menu and screen painting, interactive testing facilities and global directories.

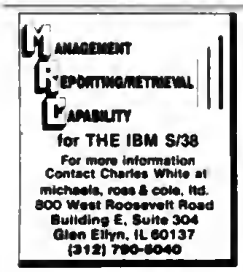
Mach 1 PAD costs $129.95.

Tominy, 4221 Malsbary Road, Cincinnati, Ohio 45242.

■

Graham Software Corp. has announced **Sclaserplus**, a publishing software package for use with IBM Personal Computers or compatibles and Hewlett-Packard Co.'s Laserjet or Laserjet Plus printers.

According to the vendor,



Boeing Computer Services helped develop and integrate the large-scale information systems that let Boeing introduce the world's most advanced jetliners, the 747, 757, and 767. And helped make Boeing the leading aerospace company in America. What's more, we've applied this home-grown expertise to the complex information needs of large government and commercial customers. So when you're ready to get your big ideas off the ground, we'll know how to make the system work.

NEW PRODUCTS/MICROCOMPUTERS

Sclaserplus integrates formatted text with business graphics and prints them together. The program includes a full-featured text editor, called Scwriterplus, as well as a user-defined icon or symbol editor, a random-access-memory-resident screen snapshot facility and a text formatter.

Sclaserplus is priced at $495.

Graham Software, 212 King St. W., Toronto, Ont., Canada, M5H 1K5.

Electronic Cottage, Inc. has announced **Image Management System Release 4.3.**

Image Management System is a graphics-presentation program for IBM Personal Computers.

The product combines business graphics with computer-aided design and free-form drawing capabilities. It allows images to be modified, combined, moved, copied, scaled and zoomed. Output can be to color monitors, slide cameras, color printers and plotters.

New features include raster-to-vector conversion, Lotus Development Corp. graphic file input, automatic charting of text charts and print files, compatibility with additional device drivers and improved device handling.

The program is priced at $995.

Electronic Cottage, 1842 Union St., San Francisco, Calif. 94123.

Practicorp International, Inc. has introduced **Exeeutive Training Wheels**, a software program designed to provide computer functionality for the nontechnical manager.

The program runs on the IBM Personal Computer and compatibles. It has three parts: Executype, a self-paced program that teaches basic keyboard concepts; Exeeuwrite, a full-featured word processor; and *The Executive Training Wheels Primer*, a user's manual.

Exeeutive Training Wheels costs $69.95.

Practicorp International, 44 Oak St., Newton Upper Falls, Mass. 02164.

■

Cubicomp Corp. has announced the **Picture Maker/20**, a member of its Picture Maker solid modeling family of three-dimesional computer graphics systems.

The system was designed to create off-line images. Images are stored as computer files that can be transferred to the Picture Maker/30 system through computer networking, disk transfer or cartridge tape.

Picture Maker/20 features 3-D animation and full-color paint software.

Picture Maker/20 is priced at $19,500.

Cubicomp, 3165 Adeline St., Berkeley, Calif. 94703.

■

Eastern Benefit Systems, Inc. has announced **Flex/Net**, software for automating the management of employee flexible spending account benefits and **Admin/Net**, an employee data base system.

Flex/Net provides an automated audit trail as it verifies payroll deduction data. It determines claim benefits, prints checks and generates explanation statements.

Admin/Net tracks and sorts employee and depen-

Continued on page 86

BOEING COMPUTER SERVICES
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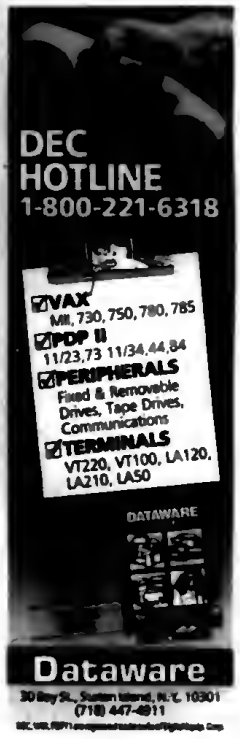

Continued from page 85

dent data for benefit records.

Both run on IBM Personal Computers and compatibles and can be used stand-alone or with the vendor's Claim/Net System.

A typical Flex/Net system costs $10,000. Admin/Net costs $7,500.

Eastern Benefit Systems, 200 Freeway Drive E., East Orange, N.J. 07018.

■

Success Software has announced **Schedule Graphics**, a program designed to print custom schedule charts from spreadsheet program files.

Schedule Graphics features graphics bar and milestone symbols for depicting activities and their relationships. Text and symbols can be combined and any time scale can be used to graphically display activity status.

Schedule Graphics runs on IBM Personal Computers or compatibles. It requires a dot matrix printer, and Lotus Development Corp.'s 1-2-3 is recommended.

Schedule Graphics costs $55.

Success Software, Suite 448, 14252 Culver Drive, Irvine, Calif. 92714.

■

Primavera Systems, Inc. has introduced **Finest Hour**, a project management system designed for short-duration, high-intensity projects in the power, process and manufacturing industries.

Finest Hour is an extension of the Primavera Project Planner. It can handle up to 10,000 activities. Up to 15 calendars may be defined in terms of hours and days. It can make hourly adjustments during plant maintenance, retrofits and outages.

Finest Hour requires 512K bytes of memory, a hard drive and Microsoft Corp. MS-DOS or IBM PC-DOS 2 or greater. It costs $5,000. Owners of Primavera Project Planner may swap their current software for Finest Hour.

Primavera Systems, Two Bala Plaza, Bala Cynwyd, Pa. 19004.

■

Gamma Productions, Inc. has announced **Multi-Lingual Scribe**, a multilanguage word processing program for IBM Personal Computers and compatibles.

The program allows users to write in combinations of English, most European languages, Hebrew, Greek, Arabic and Russian.

Multiple alphabets can be written in one file as well as viewed on screen and printed without hardware modification. Bidirectional text is fully supported by all the word processing features. Both ASCII files and Micropro International Corp. Wordstar files can be imported.

Multi-Lingual Scribe costs $184.

Gamma Production, Suite 609, 710 Wilshire Blvd., Santa Monica, Calif. 90401.

■

Applied Publishing Technolgoies has announced **Textplanner**, a typesetting-oriented text editor for IBM Personal Computers and compatibles.

Textplanner is based on the resident text entry module of the vendor's Pageplanner composition and page makeup system. It features split-screen editing, pop-up windows and instant access to all existing files from within a story.

The system supports full pathing of directories. It is compatible with Borland International, Inc.'s Turbo Lightning on-line dictionary and thesaurus.

Textplanner costs $495.

Applied Publishing Technologies, P.O. Box 3568, 1200 29th St. NW, Washington, D.C. 20007.

■

Microsystems Engineering Corp. has announced a personal version of its **Mass-11 PC** word processing package as well as corporate and professional versions.

The personal version is suitable for floppy-based or laptop systems and small networks. It offers the same keystrokes and file structure as other versions.

The corporate version requires a hard disk and 320K bytes of memory. It is available for the IBM Personal Computer and the Digital Equipment Corp. Rainbow. The professional version is available only for the IBM Personal Computer with a hard disk.

The personal, corporate and professional versions cost $195, $295 and $395, resepctively.

Microsystems Engineering, Suite 400, 2400 W. Hassell Road, Hoffman Estates, Ill. 60195.

■

Softcraft, Inc. has announced **Laser Fonts**, a laser printer program said to provide fonts, downloading and font editing capabilities.

Laser Fonts includes fonts in sizes ranging from eight to 24 points and a data base of more than 1,500 mathematical and foreign language characters and special symbols.

Laser Fonts works automatically with Microsoft Corp.'s Word and Softcraft Inc.'s Fancy Font and Fancy Word. It runs on IBM PC-DOS and Microsoft MS-DOS computers with the Hewlett-Packard Co. Laserjet Plus, Canon U.S.A., Inc. LBP8A1 and 8A2 and compatible printers.

Laser Fonts costs $180.

Softcraft, 222 State St., Madison, Wis. 53703.

■

AT&T Information Systems and **Innovative Software, Inc.** have an-

Continued on page 90

SAS Institute Inc. Announces

Lattice C Compilers for Your IBM Mainframe

Two years ago...
SAS Institute launched an effort to develop a subset of the SAS® Software System for the IBM Personal Computer. After careful study, we agreed that C was the programming language of choice. And that the Lattice® C compiler offered the quality, speed, and efficiency we needed.

One year ago...
Development had progressed so well that we expanded our efforts to include the entire SAS System on a PC, written in C. And to ensure that the language, system, and commands would be identical across all operating systems, we decided that all future versions of the SAS System—regardless of hardware—would be derived from the same source code written in C. That meant that we needed a C compiler for IBM 370 mainframes. And it had to be good, since all our software products would depend on it.

So we approached Lattice, Inc. and asked if we could implement a version of the Lattice C compiler for IBM mainframes. With Lattice, Inc.'s agreement, development began and progressed rapidly.

Today...
Our efforts are complete—we have a first-rate IBM 370 C compiler. And we are pleased to offer this development and to you. Now you can write to a single language that is source code compatible with your IBM mainframe and your IBM PC. We have faithfully implemented not only the language, but also the supporting library and environment.

Features of the Lattice C compiler for the 370 include:

- Generation of reentrant object code. Reentrancy allows many users to share the same code. Reentrancy is not an easy feature to achieve on the 370, especially if you use non-constant external variables, but we did it.
- Optimization of the generated code. We know the 370 instruction set and the various 370 operating environments. We have over 100 staff years of assembler language systems experience on our development team.
- Generated code executable in both 24-bit and 31-bit addressing modes. You can run compiled programs above the 16 megabyte line in MVS/XA.
- Generated code identical for OS and CMS operating systems. You can move modules between MVS and CMS without even recompiling.
- Complete libraries. We have implemented all the library routines described by Kernighan and Ritchie (the informal C standard), and all the library routines supported by Lattice (except operating system dependent routines), plus extensions for dealing with 370 operating environments directly. Especially significant is our byte-addressable Unix®-style I/O access method.
- Built-in functions. Many of the traditional string handling functions are available as built-in functions, generating in-line machine code rather than function calls. Your call to move a string can result in just one MVC instruction rather than a function call and a loop.

In addition to mainframe software development, you can also use our new cross-compiler to develop PC software on your IBM mainframe. With our cross-compiler, you can compile Lattice C programs on your mainframe and generate object code ready to download to your PC.

With the cross-compiler, we also offer PLINK86™ and PLIB86™ by Phoenix Software Associates Ltd. The Phoenix linkeditor and library management facility can bind several compiled programs on the mainframe and download immediately executable modules to your PC.

C, the language of choice...
C supports structured programming with superior control features for conditionals, iteration, and case selection. C is good for data structures, with its elegant implementation of structures and pointers. C is conducive to portable coding. It is simple to adjust for the size differences of data elements on different machines.

Continuous support...
At SAS Institute, we support all our products. You license them annually; we support them continuously. You get updates at no additional charge. We have a continuing commitment to make our compiler better and better. We have the ultimate incentive—all our software products depend on it.

For more information...
Complete and mail the coupon today. Because we've got the development and for your tomorrows.

Tomorrow...
We believe that the C language offers the SAS System the path to long portability and maintainability. And we believe that other companies will make similar strategic decisions about C. Already, C is taught in most college computer science curriculums, and is replacing older languages in many. And almost every computer introduced to the market now has a C compiler.

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NCR introduces a number of innovations. The 9800.

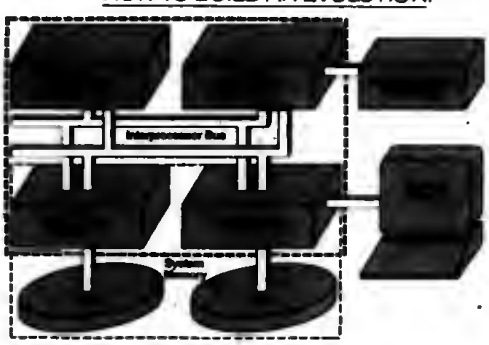
The evolution of the mainframe.

You have probably heard a lot about the computer revolution.

But revolution isn't the best way for a computer to change.

Evolution is. And the new NCR 9800 is a perfect example.

HOW TO BUILD AN EVOLUTION.



The evolutionary architecture in a 9800. Loosely coupled processors, connected by buses, let you upgrade in smaller slices and process faster.

The secret is architecture.

Inside the 9800, we loosely couple powerful application processors (these do the work), with data storage processors (these manage the work flow).

What does this mean to you?

Say your business, like most, processes its transactions in peaks and spurts. A 9800 can handle your work load better and ensure quicker response than a conventional mainframe of comparable power.

You see, we developed a special "system memory" for your most frequently used files. And all the processors can share these files. Automatically. What's more, the processors team up—again, automatically—during these peaks, so the system has the agility to process increased work loads, whenever they occur.

Sounds simple, but conventional mainframes can't do it unless someone writes complicated application software.

With a 9800, it's part of the system.

So the computer is more efficient, more economical, and very flexible.

HOW TO GROW A MAINFRAME.

The 9800 doesn't have to be upgraded in large pieces.

It grows gradually, just the way a business grows.

You start with the power you need, and then you can expand in smaller increments than with conventional mainframes.

You can even add job-specific modules to handle specific functions.

IT'S MORE FAULT-TOLERANT THAN YOU ARE.

Conventional fault-tolerant systems work one of two ways: Either by doing the work twice, which is unproductive, or by using a software solution that slows processing down.

We invented a more efficient system.

Set up a 9800 for fault-tolerance and, if a module fails, other modules take over while continuing to do their own jobs.

It'll run during a processor failure. Or a software failure.

It'll even run during routine maintenance or upgrading.

NCR's highly-reliable 32-bit VLSI processor chip.

It's built with 32-bit VLSI technology that has fewer components than conventional technology.

So, the chance of a failure inside the 9800 is very slim.

Because if something isn't there,it can't break.

THE REST.

The 9800 was built to be an excellent on-line transaction processor and an excellent general purpose processor.

So it can be tailored to do both jobs more economically than conventional mainframes.

It's also an open system.

And it uses SNA and X.25 communications, so it can work together with other computers you may already own.

It comes with popular software tools, like SQL and MANTIS,™ and with C, COBOL, and BASIC languages.

And you have a choice of many ready-to-run solutions for business.

Now, do you read the industry press?

Well, according to them, you can buy a computer like the NCR 9800, with its advanced architecture, that'll be just as flexible and economical from another computer company.

In about 1990.

For information, call 1-800-CALL-NCR.

NCR 9800. The evolution of the mainframe.

NCR

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VTAM + NCP

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- Provides response times for CICS (host and network) without the need to run CICS in a SNA definite response mode.
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ChicagoSoft — 738 N. LaSalle St., Chicago, IL 60610

NEW PRODUCTS/MICROCOMPUTERS

Continued from page 88

nounced that they will co-label a version of Innovative Software's **Smart Software System** that will run under Microsoft Corp. MS-DOS and Unix.

AT&T will offer the package later this month for their Personal Computer 6300 and 7300 and later this year for the 6300+.

Smart Software System is a series of personal productivity applications. The conversion utility permits files and data to be exchanged between Unix and MS-DOS versions on PC 6300s or on 7300s equipped with DOS 73 coprocessors.

The Unix PC version will cost $895. The data base module costs $495; the word processing module costs $395.

AT&T Information Systems, 1 Speedwell Ave., Morristown, N.J. 07960.

Software languages

Wordtech Systems, Inc. has introduced **Hot C**, a C language compiler.

The basic Hot C package contains the compiler, a C language tutorial, a program editor and a symbolic debugger. Hot C is available for Microsoft Corp. MS-DOS, IBM PC-DOS and Digital Research, Inc. CPM/80 and CPM/86 operating systems.

The product costs $99.

Wordtech Systems, P.O. Box 1747, Orinda, Calif. 94563.

Software utilities

Publisher's Software Network has announced the **Text Indexer**, a program for the IBM Personal Computer said to scan any text file and create complete vocabulary or glossary word lists and an index showing the page numbers where words and topics are located.

The word list can be edited to remove unwanted entries and to add longer or multiple words. It can also be cross-referenced.

The program is priced at $239.

Publishers Software Network, 4314 Sage Circle, Salt Lake City, Utah 84124.

■

Cubicomp Corp. has introduced **True Color Paint**, a 16-bit true-color paint package for its Picture Maker personal computer-based, three-dimensional computer graphics system.

The package is said to enable users to display more than 65,000 colors within a single image. Colors can be blended and portions of an image can be tinted and shaded without affecting picture detail.

True Color Paint costs $3,950.

Cubicomp, 3165 Adeline St., Berkeley, Calif. 94703.

■

JEM Transform Technologies, Ltd. has announced **Pendulum-RTM**, a product designed to allow personal computers to perform and improve upon the functions of hardware monitors used in measuring mainframe response time.

Pendulum-RTM allows a personal computer to monitor the response time of mainframe computers from companies such as IBM, Digital Equipment Corp. and Hewlett-Packard Co.

Pendulum-RTM costs $395.

JEM Transform Technologies, 14th Floor, 275 Slater St., Ottawa, Ont., Canada K1P 5H9.

■

Knipfty Software has announced **Tight Security Version 2.1**, an enhanced version of its compression and encryption software utility.

Tight Security is said to compress standard ASCII or text files up to 50% of their original size while encrypting the file.

Tight Security runs under IBM PC-DOS or Microsoft Corp. MS-DOS Version 2 or higher. It costs $129.95.

Knipfty Software, 24 Markwood Lane, East Northport, N.Y. 11731.

■

Software Development Factory has announced **Dbfind**, a multipur-

Continued on page 94

Break the IBM 3278 Coax Connection and Get Your Data Where It Needs to Go

Use this RS232C interface as a gateway onto a LAN . . . access public databases served by packet switched networks . . . access data-only PBX . . . dialup the mainframe using low-cost async modems and a matching Local Data protocol converter at the host end . . . all with a keystroke command switching from IBM to ASCII mode. And for the best coax elimination solution, solve your connectivity problems using a VersaLynx with a companion Local Data product, InterLynx™/3278.

When operating in ASCII mode the VersaLynx™/3278 emulates a standard terminal, such as the VT-100/102, VT-52, ADM3A, Televideo 925, IBM 3101 or a custom configuration of the user's choice. Color and data rates up to 19.2K bps are supported.

Put a VersaLynx at each terminal or install a 16 channel rack at the controller site. For detailed information and systems assistance call (213) 320-7126. Canada (613) 748-8791. UK (0983) 56791.

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*Dataquest 1985 mid-year terminal shipment update.

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Continued from page 90

pose, professional-caliber programming tool for finding bugs in Ashton-Tate's Dbase command files.

Dbfind is said to list all syntax errors, generate a cross-module cross-reference and generate a single-module cross-reference. It supports either Dbase II or Dbase III.

Dbfind is priced at $99.

Software Development Factory, P.O. Box 1106, Hunt Valley, Md. 21030.

Software enhancements

Lifeboat Associates has released **Run/C Version 2.**

Run/C is a C language interpreter. Version 2 is said to include a fully integrated full screen editor, improved language implementation and performance and built-in graphics functions for IBM Personal Computers and compatibles.

Run/C is available for IBM Personal Computers, Personal Computer XTs, ATs and compatibles or other systems with Microsoft Corp. MS-DOS and ANSI terminal driver. It requires a minimum of 256K bytes of random-access memory.

Including a manual, Run/C Version 2 costs $120.

Lifeboat Associates, 55 S. Broadway, Tarrytown, N.Y. 10591.

■

Zylab Corp. has announced **Zyindex 2,** an enhanced version of its full text search software for IBM Personal Computers and compatibles.

Zyindex 2 is compatible with CD-ROM devices, write-once-read-many optical discs, certain local-area networks and 26 word processors, including IBM word processing protocols.

New features include select searching, the ability to display extended ASCII characters and an annotated mark-and-save capability.

Three versions are available. The standard version, which can search 500 files, costs $145; the Professional version, handling 5,000 files, costs $295; and the Plus version, handling 15,000 files, costs $695.

Zylab, 233 E. Erie St., Chicago, Ill. 60611.

■

Compupro has introduced **CP/M 68K Revision 1.3** an enhanced and updated version of Digital Research, Inc.'s operating system for Motorola, Inc. 68000-type processors.

New features include support for its Spuz 8 MHz slave processor, which allows 8-bit CP/M 80 programs to be run in a Motorola 68000 environment, support for interrupts with full type-ahead character input buffering, a full C compiler and a full Forth-83 language environment.

CP/M 68K Revision 1.3 costs $400. Licensed owners of previous CP/M 68K releases may upgrade for $125.

Compupro, 26538 Danti Court, Hayward, Calif. 94545.

Communications

Torus Systems, Inc. has enhanced its **Tapestry** local-area network software, **Remote Network Link** (RNL) and **Remote Access Gateway** (RAG) and introduced **Advanced Gateway Sapport** (AGS) and **Torus 3270 SNA Gateway.**

Tapestry Version 1.4, designed for use on Netbios-compatible network hardware or 3Com Corp. Etherlink hardware, offers enhanced external communications, improved compatibility with applications software and improved standard features. The Network Manager Pack costs $495, and the Workstation Pack costs $295.

RNL Version 1.4 provides Tapestry users remote access to the Tapestry network using ordinary phone lines and a personal computer equipped with a modem. RNL costs $295.

RAG configures a Tapestry network so that it may support RNL users. RAG costs $250 per network.

AGS extends the asynchronous communications capabilities of a Tapestry net to provide Digital Equipment Corp. VT100 emulation. It costs $795 per network.

The Torus 3270 SNA Gateway provides up to 32 Tapestry users concurrent access to an IBM mainframe computer. Prices range from $5,495 to $7,495.

Torus, Suite 105, 495 Seaport Court, Redwood City, Calif. 94063.

■

Standard Microsystems Corp. has introduced the **Arcnet-PC200** local-area net-

work controller board.

The board is said to allow users to configure a local-area network on IBM Personal Computers or compatibles.

The user can string or daisy chain up to eight network nodes off of a single line. It has a 2K-byte on-board data packet buffer, providing four pages of packet storage.

The Arcnet-PC200 costs $595.

Standard Microsystems, 35 Marcus Blvd., Hauppauge, N.Y. 11788.

Trisystems has introduced the **TC-5251 Twinax**, a twin-axial emulator. TC-5251 Twiunax is said to allow personal computers to communicate to a host through either an IBM 5250 control unit or direct connection to the host with a local attachment.

The TC-5251 Twinax reportedly can be used to communicate with an IBM System/34, 36 or 38.

The hardware and software provide all the features and functionality of an IBM 5251 display station.

According to the vendor, it supports IBM 5224, 5225 and 5256 printers.

It also supports host software as well as applications designed for the IBM 5251, 5291 and 5292 terminals.

The TC-5251 Twinax costs $895.

An optional 3180 keyboard is priced at $329.

Trisystems, 74 Northeastern Blvd., Nashua, N.H. 03062.

Prentice Corp. has announced the **Popcom 2400**, a 2,400 bit/sec. half-card modem for the IBM Personal Computer and compatibles.

The Popcom 2400 is a full-duplex modem featuring automatic adaptive equalization, which adjusts varying phone line conditions to assure accurate data transmission over common carrier lines.

Other features include autoanswer, autodial, automatic bit rate and parity selection, autospeed recognition on answer and automatic call monitoring under software control.

The Popcom 2400 costs $595.

Prentice, 266 Caspian Drive, Sunnyvale, Calif. 94088.

■

Advanced Computer Technology has announced the **ACT 2000 Telex** board for IBM Personal Computers and compatibles.

The board comes with software that allows users to receive and store incoming telex messages on the disk even while the computer is unattended or being used.

Other features include automatic transmission of previously prepared messages, destination checking and abbreviated dialing.

The ACT 2000 Telex board costs $495.

Advanced Computer Technology, Worcester-Providence Tnpk., Sutton, Mass. 01527.

■

Simware, Inc. has announced **Sim/RTM**, a personal computer-based application said to monitor system response across asynchronous X.25 and IBM 3270 networks.

Sim/RTM can operate in various network configurations including asynchronous networks and Systems Network Architecture and can be installed on both local and remote attached micros.

The software can emulate an IBM 3278 Model 2, Digital Equipment Corp. VT100 or a teletypewriter terminal and can be used to monitor response from any host system.

Sim/RTM costs $425.

Simware, Suite 100, 14 Concourse Gate, Nepean, Ont., Canada K2E 7S6.

■

Adax, Inc. has announced **Callsort**, a call accounting software package that runs on IBM Personal Computers and compatibles.

Callsort allows storage of call information from the phone system while the personal computer is being used for other applications.

It generates standard reports including compilation by account or authorization code and provides a set of traffic reports. It also allows interfacing to other programs such as Lotus Development Corp.'s 1-2-3.

Callsort features a station directory package and a relative pricing module.

Callsort, capable of handling up to 200 extensions, costs $395. Callsort/1000, capable of handling up to 1,000 extensions, costs $895.

Adax, 6961 Peachtree Industrial Blvd., Norcross, Ga. 30071.

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NEW PRODUCTS/MICROCOMPUTERS

Talbott Corp. has announced **Cometlink PC/XT** and **Cometlink PC/AT**, optional packages for its Comet PC/XT and PC/AT designed to allow these personal computers to double as batch terminals for uploading and downloading with IBM, Burroughs Corp., Digital Equipment Corp., Honeywell, Inc. as well as Sperry Corp. mainframes.

Cometlink PC/XT and PC/AT are single packages of hardware and software. They can be used for retrieving and manipulating data from the mainframe for word processing, spreadsheet and data base management applications, according to the vendor.

The Cometlink PC/XT is priced at $2,295. The Cometlink PC/AT costs $3,995.

Talbott, Suite 7, 2545 Chandler Ave., Las Vegas, Nev. 89120.

McDonnell Douglas Computer Systems Co. has announced **Reallink**, a personal computer connectivity software package.

The software is said to allow a Microsoft Corp. MS-DOS-equipped personal computer to be connected to a McDonnell Douglas Computer Systems Reality-based host minicomputer.

It allows PCs to run in terminal emulation mode. It also allows PCs to use the host as a file and print server.

The one-time license fee for Reallink is about $500 per personal computer.

McDonnell Douglas Computer Systems, 17481 Red Hill Ave., Irvine, Calif. 92714.

■

Alloy Computer Products, Inc. has introduced **NTNX**, software that enables the company's PC-Plus multiuser products to support applications software developed to run under Novell, Inc.'s Netware local-area network software.

NTNX supports all applications software for Novell local-area networks that employ Netware's logical record-locking calls. It runs transparently with Microsoft Corp. MS-DOS or IBM PC-DOS 3 or higher on the host personal computer, providing record- and file-locking controls. It also provides global random-access memory disk caching.

NTNX is priced at $395.

Alloy Computer Products, 100 Pennsylvania Ave., Framingham, Mass. 01701.

Data storage

EMC Corp. has announced a **series of memory upgrade options** featuring 256K bytes of random-access memory chips for Wang Laboratories, Inc. VS computers.

According to the vendor, the upgrades enable users to expand the memory capacity of their VS 85 systems up to 8M bytes and VS 100 systems to a maximum of 16M bytes.

The memory boards feature on/off switches, power lights and activity indicators to monitor board-level use.

The upgrades cost $6,000 per 1M byte.

EMC, 12 Mercer Road, Natick, Mass. 01760.

■

CMS, Inc. has announced the **Perfect 10 — CPII** 10M-byte hard disk for the Compaq Computer Corp. Portable II computer system.

The internal disk drive subsystem comes with formatting software and mounting hardware and cables and interfaces with the Portable II's built-in hard-disk controller. The four-head, 3½-in. drive is said to provide 85 msec average access time and replaces one of the floppy drives provided with the computer system.

The Perfect 10 — CPII costs $945.

CMS, 401-B W. Dyer Road, Santa Ana, Calif. 92707.

■

Sigma Designs, Inc. has announced the **Qic 36 Streaming Tape Controller**.

The Qic 36 card is said to use minimal power and fit in a single IBM Personal Computer XT short card slot.

According to the vendor, the con-

Continued on page 100

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A large travel agency with 900-plus on-line terminals uses MODEL 204 to maintain information on accommodations and transportation options around the world. In a benchmark simulating 1,000 users, 1,920 complex transactions were made in one minute on the travel agency's 2-gigabyte database. Response time? An average of 1.1 seconds.

The simple fact is, there is no relational-based DBMS that can store more, or handle it faster than MODEL 204, no matter how complex your queries get.

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Their 10-gigabyte database contains 4,000 fields, of which 3,000 are keyed. Average response time to extremely complex queries of 3,000 or more transactions per minute? Less than 10 seconds. For less complex queries, response time drops to less than 2 seconds.

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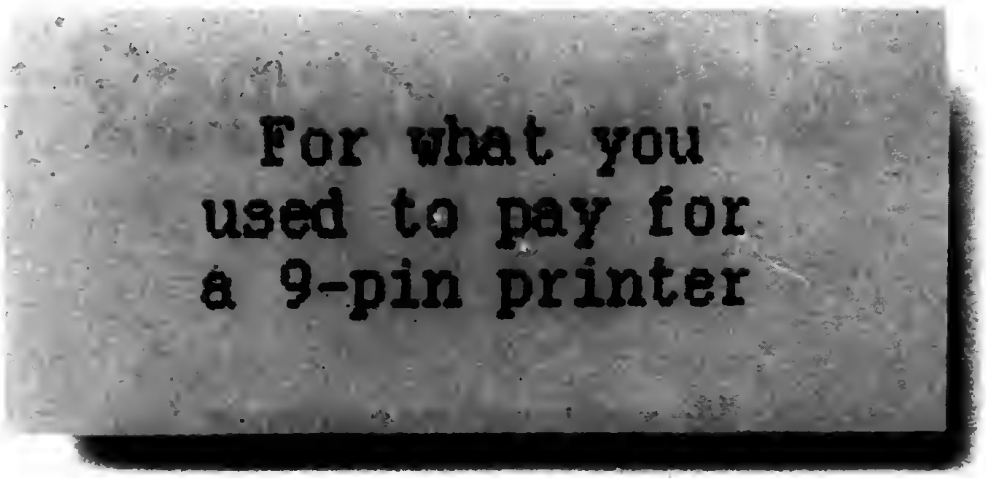

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NEC Information Systems, Inc.

NEW PRODUCTS/MICROCOMPUTERS

Continued from page 96

troller gives users backup within single or multiple personal computer environments.

The Qic 36 Streaming Tape Controller is priced at $299.

Sigma Designs, 2023 O'Toole Ave., San Jose, Calif. 95131.

Printers/plotters/peripherals

Inmac Corp. has announced the **Universal Data Buffer**, designed as a holding tank for data sent to a printer or plotter.

The buffer is said to work with both serial and parallel interfaced equipment, leaving the computer free for other applications. Two peripherals may be buffered at once. Data may be sent to a plotter and a printer instantly without disconnecting cables.

The 64K-byte Universal Data Buffer costs $385, and the 256K-byte Universal Data Buffer costs $560.

Inmac, 2465 Augustine Drive, Santa Clara, Calif. 95054.

■

BDT Products, Inc. has announced two versions of the **Lettermate I/E** sheet feeder, both compatible with IBM's Quietwriter printer.

The sheet feeders can be added to the existing system. All parts snap together without any modification to either printer or IBM system.

The single-bin Lettermate I/E is priced at $295. An optional second bin may be purchased for $200. The dual-bin sheet feeder costs $495.

BDT Products, 17152 Armstrong Ave., Irvine, Calif. 92714.

■

Summagraphics Corp. has introduced a new version of its **Mactablet** graphics tablet for the Apple Computer, Inc. Macintosh.

The new version is said to provide 12 in. by 12 in. of active work area for all graphics needs, including professional drawings, freehand artwork and mapping. Work can appear on a one-to-one basis or be reduced on a direct scale to the screen size of the Macintosh. Drawings can be input freehand or traced through material up to ¼-in. thick.

The Mactablet costs $549.

Summagraphics, 777 State St. Extension, Fairfield, Conn. 06430.

■

Juki Office Machine Corp. has announced the **Juki 6500** printer.

The Juki 6500 offers a maximum print speed of 60 char./sec., 10/12/15 pitch and proportional spacing. It comes standard with a 3K-byte buffer memory, expandable to 15K bytes. It provides special print features such as superscript, subscript, underlining, boldface, shadow printing and graphics capability.

The Juki 6500 is priced at $1,395.

Juki, 299 Market St., Saddle Brook, N.J. 07662.

■

Thomson Consumer Prodacts Corp. has announced the **VM3901DA/DG** 15-in. monochrome monitor.

The monitor supports 132-col. displays and can transform color signals into 16 shades of amber or green. It operates at both 15.7 kHz and 18.4 kHz and can be used with either a monochrome or color graphics card.

The VM3801DG with a green display costs $199. The VM3801DA with an amber display costs $209.

Thomson has also added the ability to receive red-green-blue analog input signals and display up to 4,096 colors to its CM31481VI, CM36512VI, CM36432SI, CM36382SI and CM31311SI monitors at no cost.

Thomson, # 111, 5731 W. Slauson Ave., Culver City, Calif. 90230.

■

Philips Information Systems, Inc. has announced the **Philips Laserprinter**.

The laser printer was designed for the Philips 3004/3005 system but is said to be compatible with most personal computers. It offers seven fonts, including an additional eight-font cartridge, and can provide up to 400 custom-built fonts. It prints at speeds up to eight pages per minute.

The Philips Laserprinter is priced at $4,390.

Philips Information Systems, Suite 300, 15301 Dallas Pkwy., LB 35, Dallas, Texas 75248.

■

Syntest Corp. has announced the **SP-2010 Printer** designed for industrial applications.

The SP-2010 uses a 5-in. by 9-in. dot matrix impact print head driven by a fiberglass rubber belt. It provides an 80-col. print field and bidirectional printing at speeds up to 130 char./sec.

Internal electronics provide full feature control of font size, line and paper feed and dot-addressable graphics.

The SP-2010 costs $985.

Syntest, 40 Locke Drive, Marlboro, Mass. 01752.

■

Summagraphics Corp. has unveiled an electronic computer mouse, called **Summamouse**, for use with the IBM Personal Computer and compatibles.

Summamouse features a driver and menu-selection system said to interface with software programs such as Lotus Develoment Corp.'s 1-2-3, Micropro International Corp.'s Wordstar and Microsoft Corp.'s Word. It has three action keys and operates on a 9-in. by 11-in. grid-patterned pad.

Other features include an onboard microprocessor, continual self-

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NEW PRODUCTS/MICROCOMPUTERS

checking, built-in RS-232C board and solid-state optical technology, according to the vendor.

Summamouse costs $119.

Summagraphics, 777 State St. Extension, Fairfield, Conn. 06430.

■

BDT Products, Inc. has announced **Flipper**, a device designed to keep laser printer pages in sequential order.

Flipper is said to fit most laser printers, according to BDT Products. These printers include the Hewlett-Packard Co. Laserjet and Laserjet Plus and the Canon U A. LBP-8.

According to the vendor, its bin holds 400 pages.

Flipper is priced at $200.

BDT Products, 17152 Armstrong Ave., Irvine, Calif. 92714.

Omnitronix, Inc. has announced the **Ramjet 256K-byte Print Buffer**.

The Ramjet comes with 256K bytes of buffer memory. It connects between the computer and the printer. It is available in either serial or parallel versions and is compatible with standard parallel or RS-232 printers. Features include a pause mode for using single sheets of paper and a power supply.

The Ramjet printer buffer costs $269.

Omnitronix, P.O. Box 43, Mercer Island, Wash. 98040.

■

Printer Products, a division of Capitol Circuits Corp., has announced the **Models S-600** and **S-610** slip and document flat-bed printers.

The printers feature up to 16K bytes of program memory, RS-422A interface and daisy-chain printer select for multiprinter environments. They print the 96-character ASCII set bidirectionally, 40-col. at 12 char./in. and at 3 line/sec. in three print modes.

Other features include top and bottom of form sensors, adjustable document stop, rapid line feed and self-test capabilities.

In quantities of 50, the S-600s cost $684 each and the S-610s cost $716 each.

Printer Products, 25 Denby Road, Boston, Mass. 02134.

■

Sigma Designs, Inc. has announced the **Model ATE-0000** expansion chassis for the IBM Personal Computer AT.

The ATE-0000 features from one to five programmable wait states, full direct memory access memory transfer, on-board erasable programmable read-only memory for configuration table storage and built-in test circuitry.

The chassis provides expansion slots for 10 add-on cards, either 16- or 8-bit, and can accommodate three half-height 5¼-in. peripherals. According to the vendor, ATE-0000 chassis can be linked to a single AT in daisy chain or star configuration.

The ATE-0000 is priced at $2,499.

Sigma Designs, 2023 O'Toole Ave., San Jose, Calif. 95131.

■

Printmanager, Inc. has introduced the **Printmanager Model PM6**, a six-port, printer-sharing system.

PM6 allows users to share lasers, plotters and other serial or parallel printers. One to five microcomputers can provide inputs to PM6's 64K-byte dynamically allocated buffer, which is upgradable to 1M byte.

Features include concurrent bidirectional input and output, 40 character start- and end-of-job messages, front panel selection for configuration, time-out, automatic form feed and end-of-job, handling of 300 to 19.2K bit/sec. rates and cascade mode.

PM6 costs $995.

Printmanager, 108 Water St., Watertown, Mass. 02172.

■

Mitsubishi Electronics America has introduced the **C-8652**, the **C-6679** and the **FG-6600**, three 15-in. high-resolution monitors for engineering computer-aided design and manufacturing workstations.

The C-8652 and the C-6679 offer 0.31mm dot pitch, self-convergence in-line gun, low power consumption and tap-changing power supply. The FG-6600 offers a 0.25mm dot pitch (0.31mm pitch optional), 1.28 by 1K-byte resolution, compared with 1,024 by 780 lines for the other two models.

The FG-6600, C-8652 and C-6679 cost $2,995, $2,495 and $2,195, respectively.

Mitsubishi, 991 Knox St., Torrance, Calif. 90502.

Board-level devices

Verticom, Inc. has announced the **H-16**, a 1,024 by 768 pixel graphics controller.

The H-16 was designed for personal computer-based computer-aided design and drafting applications utilizing the IBM Personal Computer AT and compatibles. It is said to emulate the IBM Enhanced Graphics Adapter, Color Graphics Adapter and Monochrome Display Adapter.

The controller has more than 1.3M bytes of display memory. It offers 16 displayable colors from a palette of 4,096.

The H-16 is priced at about $2,995.

Verticom, 545 Weddell Drive, Sunnyvale, Calif. 94089.

■

Paradise Systems, Inc. has introduced the **Hi-Res Graphics Card**, a video display adapter for the IBM Personal Computer family and compatibles.

The card is said to provide the

Continued on page 102

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clutter, less expense, and easier access to multiple applications.

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Continued from page 101

maximum resolution and color from standard IBM color and monochrome monitors. It is compatible with the IBM Color Graphics Adapter, the IBM Monochrome Adapter, the Hercules Computer Technology, Inc. Graphics Adapter and the Plantronics Colorplus cards.

The Hi-Res Graphics Card costs $299.

Paradise Systems, 217 E. Grand Ave., South San Francisco, Calif. 94080.

■

STB Systems, Inc. has announced the **Chauffeur HT**, a video display adapter for IBM Personal Computer-compatible systems.

The Chauffeur HT is said to combine the ability to display standard color graphics adapter software on IBM-compatible monochrome monitors without any drivers with Hercules Computer Technology monochrome graphics and Tseng Labs I32 character compatibility.

The Chauffeur HT runs all color graphics adapter and monochrome printer adapter software on standard red-green-blue color monitors.

The Chauffeur HT costs $349.

STB Systems, Suite 125, 601 N. Glenville, Richardson, Texas 75081.

■

Star Gate Technologies, Inc. has introduced the **MRB-2000**, an expanded memory board for the IBM Personal Computer AT and compatibles.

The board is compatible with multiuser, multitasking operating systems and with systems running at 8 MHz. It is available with zero kilobytes, 512K bytes, 1M byte, 1.5M bytes and 2M bytes of memory.

Prices range from $282 to $872.

Star Gate Technologies, Suite 109, 33800 Curtis Blvd., Eastlake, Ohio 44094.

■

Agile has unveiled **Klone**, a replacement for Digital Communications Associates, Inc.'s Irma hardware.

Klone allows the attachment of an IBM Personal Computer or compatible and an IBM 3270 controller or Display Printer Adapter through an IBM 3270 coax. It features 8K bytes of random-access and display memory for emulating 3278 and 3279 Models 2, 3 and 4 screen formats.

Klone costs $595.

Agile, 4041 Pike Lane, Concord, Calif. 94520.

■

Sigma Designs, Inc. has introduced the **TurboEGA**, **Turbo400** and **Fastcache286** accelerator cards for the IBM Personal Computer and Personal Computer XT.

The Fastcache286 card includes 4K-byte cache memory, optional Intel Corp. 80287 coprocessor and hardware reset switch.

The TurboEGA was designed for general business applications, and the Turbo400 provides high-resolution graphics capabilities.

The Fastcache286, the TurboEGA and the Turbo400 cost $649, $899 and $949 respectively.

Sigma Designs, 2023 O'Toole Ave., San Jose, Calif. 95131.

COMMUNICATIONS

Controllers

Micom Systems, Inc. has introduced its **Micro4900 Digital Transceivers** said to automatically adapt to standard AT&T Dataphone Digital Service link speeds of 2,400, 4.8K and 9.6K bit/sec.

The transceivers combine Data Service Units with Channel Service Units to yield Integrated Service Units. They can operate in point-to-point and multipoint applications and can support synchronous inputs. They are available as stand-alone packages and as card modules.

Prices range from $645 to $725. A central site chassis, capable of holding a mix of up to 16 digital transceivers, leased-line modems and dial back-up units costs $995.

Micom Systems, P.O. Box 8100, 4100 Los Angeles Ave., Simi Valley, Calif. 93062.

Voice/data communications

VMX; Inc. has added several call-transfer features to its **Voice Message Exchange** system.

The enhancements include the ability to dial 0 to reach the operator before or after leaving a voice message when using either the call answering or message desk feature. Also, when a user accesses the voice mailbox he can now dial 001 to receive a dial tone, dial an extension number and initiate a transfer to another extension.

The Voice Message Exchange system ranges in price from $50,000 for a low-end, 100-user, four-port system to $500,000 for a high-end, 8,000-user, 170-port system.

VMX, 17217 Waterview Pkwy., Dallas, Texas 75252.

■

GTE Communications Systems Corp. has enhanced its **GTE Starlog** digital voice and data communication system.

The system is said to switch simultaneous voice and asynchronous or synchronous data at rates of 19.2K bit/sec. and enable users to have customized data bases for every station location.

New features include a complete lodging feature package, key telephone features such as one-touch operation for line or intercom, enhanced data options and expanded line capacity for up to 80 data sta-

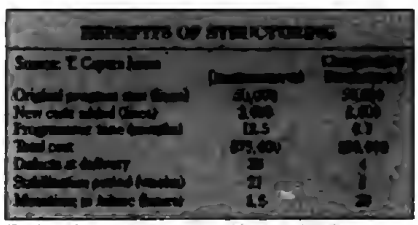
YOU DON'T HAVE A COBOL PROGRAM SO PATCHED AND TANGLED IT CAN'T BE STRUCTURED AUTOMATICALLY.

Until recently, there were only two ways to deal with the patched-up, hand-me-down, unstructured COBOL programs that consume up to 70 percent of your company's software effort.

You could continue to live with the old programs, patching and mending as best you could. Or you could scrap the programs, at enormous cost and disruption, in favor of an entirely new system.

But now there is a third alternative. COBOL structuring. The advantages of this alternative are enormous. Among them, the ability to reduce maintenance costs by 50 percent by more effectively using your programming resources.

The technological leader in COBOL structuring is Language Technology, Inc. In fact, of the very few companies who claim to have a COBOL structuring solution at all, Language Technology is the only one with a system, called RECODER,™ that is fully automatic. The others automate only a portion of the structuring task, leaving the really tough parts to be done manually, over a period of weeks or more, by trained experts, who, because they are human, will make mistakes.



The benefits of structuring are illustrated in this example, representing the costs of adding 2000 lines of new code to an unstructured program of 50,000 lines, as compared to adding the same number of lines to the same size structured program.

Based on proprietary language processing techniques and pioneering research in graph theory, RECODER has reduced the tremendously complex mathematics involved to a provably correct solution so complete that it does not force you to accept its own style of structured code. You can select the level of nesting, type of operators, complexity of expressions, formatting style, representation of procedures, and many other features that might be required by your own in-house standards.

RECODER, available as a service or by license, can automatically structure thousands of lines of COBOL in minutes, without the necessity of adding

tions according to the vendor.

A typical 64-station, mid-range, fully equipped system is priced from $250 to $275 per line.

GTE Communications, 2500 W. Utopia Road, Phoenix, Ariz. 85027.

Protocol converters

Micom Systems, Inc. has announced the **Micro7881** and **Micro7887** protocol converters for users of the IBM 3270 Information Display System.

The Micro7881 lets asynchronous CRT terminals and personal computers function as IBM 3278 display stations. The Micro7887 lets users replace IBM 3287 printers with any of a variety of ASCII printers with parallel or serial interfaces.

Both protocol converters attach to IBM 3270 control units or integrated display adapters using IBM Type A coaxial cable.

The Micro7881 costs $1,095. The Micro7887 costs $1,495.

Micom, P.O. Box 8100, 4100 Los Angeles Ave., Simi Valley, Calif. 93062.

■

Dynatech Packet Technology, Inc. (Dynapac) has added the **PBX.25 Gateway** to its X.25 Gateway product line.

The PBX.25 Gateway is said to meet the requirements of Northern Telecom, Inc.'s Meridian private branch exchange system. It allows users to link PBXs to form a private network. It offers a way to connect RS-422 PBX ports to a CCITT X.25 packet network or to communications equipment supporting X.25.

The PBX.25 Gateway is available in a 16-port unit for $7,240.

Dynapac, 6464 General Green Way, Alexandria, Va. 22312.

Software

The IMS Group has announced **IMS Telephone Software**, said to enable users to manage and control telephone systems' design, operation and costs.

The software operates from a single data base. It is composed of modules including equipment manager, maintenance manager, cable manager, call accounting manager and message center manager.

IMS Telephone Software is written in the C language. It runs under Microsoft Corp.'s MS-DOS on any IBM Personal Computer compatible. According to the vendor, AT&T Unix System V multiuser capability will be available in June.

IMS Telephone Software is priced at $10,000.

The IMS Group, 219 W. Rhapsody, San Antonio, Texas 78216.

Multiplexers/modems

Flexstar Corp. has introduced the **FS232 Multiplexer**, said to be able to link computers, terminals and printers using the RS-232C serial port of any IBM Personal Computer or compatible.

The unit can multiplex up to 32 devices or demultiplex 32 to one. It simultaneously transmits and receives data and control signals over the host single-port interface serial path with a cable length up to 100 ft. The RS-232C protocol supports commands of request to send, clear to send and transmit.

The 32-port FS232 costs $3,500.

Flexstar, 606 Valley Way, Milpitas, Calif. 95035.

■

Anderson Jacobson, Inc. has announced the **AJ 1411-LD** 14.4K bit/sec. multiport leased-line modem.

The modem is said to provide automatic fail-safe data transfer with automatic dial backup capability when leased lines fail. It also features a built-in time division multiplexer that enables up to six channels to transmit data simultaneously.

The AJ 1411-LD costs $4,995.

Anderson Jacobson, 521 Charcot Ave., San Jose, Calif. 95131.

Test equipment

Hard Engineering, Inc. has enhanced its **Bytebug 645**, a portable data line analyzer that incorporates a 672-char. LCD for full screen display.

The Bytebug 645 is said to operate at continuous synchronous speeds up to 256K bit/sec. half duplex, 128K bit/sec. full duplex or 38.4K bit/sec. asynchronous. The new feature, called Autofigure, enables the 645 to interpret communication line protocols to eliminate the need for entering setup parameters.

The Bytebug 645 comes with X.25 Level 3 analysis and Systems Network Architecture Level 2 analysis.

The analyzer costs $4,500.

Hard Engineering, P.O. Box 4185, Huntsville, Ala. 35802.

■

Fotec, Inc. has introduced the **Model S370** LED fiber-optic test source.

The S370 has both long and short wavelength LEDs for testing dual-wavelength systems and cabling. It has two microlensed LED sources at 820 and 1,300 nanometers. For testing connectorized cables, over 40 different adapters are available. When used with a dual-wavelength fiber-optic power meter, it allows the testing of any multimode cable for computer systems.

The S370 is priced at $1,600.

Fotec, The Schrafft Center, Box 246, 529 Main St., Boston, Mass 02129.

Auxiliary equipment

Electro Standards Laboratory, Inc. has introduced its **Model 8652-D** and **Model 9106** EIA RS-232 A, B, C,

Continued on page 104

consultants or any new people to your staff or of requiring any new skills of the people already on it. And, RECODER can do it with a cost effectiveness that will allow it to pay for itself within a year.

Because you hear a lot of promises from a lot of software companies, we can understand if you are skeptical about what we say we can do. That's why we want you to know that RECODER has been cutting its teeth on real world COBOL for four years now, successfully structuring millions of lines for such forward-looking companies as Federal Express, GTE, Phillips Petroleum, Mellon Bank and TRW. That's also why we

Send us up to 5,000 lines of your worst unstructured COBOL and we'll structure it for free.

want to give you the opportunity to put us to the test.

Send us up to 5,000 lines of your worst unstructured COBOL, maybe even that awful program written by the person who occupied your seat just before you did, and we'll structure it with RECODER for free.

To find out how, call us today at 1-800-RECODER or (617) 741-1507 or write Language Technology, Inc., 27 Congress Street, Salem, MA 01970.

LANGUAGE TECHNOLOGY

THE LEADER IN REDUCING SOFTWARE MAINTENANCE COSTS.

Continued from page 103

D, E, F switches.

The switches were designed to provide the capability to share one computer port among six peripherals or one peripheral among six minis, micros or mainframes. Both models switch all signals at the EIA RS-232 interface.

The Model 8652-D is priced at $395. The Model 9106 costs $495.

Electro Standards Laboratory, P.O. Box 9144, Providence, R.I. 02940.

SYSTEMS & PERIPHERALS

Processors

Sigma Information Systems has introduced the **SA-H124** stand-alone Q-bus system chassis for the Digital Equipment Corp. LSI-11.

The cabinet is said to fit under desktops. It has an eight-row, quad-wide Q-bus backplane that contains 16 dual slots with 22-bit addressing and Q-bus termination.

The SA-H124 is priced at $1,905.

Sigma Information Systems, 3401 E. La Palma Ave., Anaheim, Calif. 92806.

■

Pinnacle Systems, Inc. has announced the **Pinnacle XL020** and **XL020+**, two multiuser supermicrocomputers that incorporate the 32-bit Motorola, Inc. 68020 central processor with dual 68000 I/O processors.

The desktop XL020 supports up to 40 users. It features 2M bytes of random-access memory (RAM), expandable to 4M bytes, with hard-disk capacity from 72M to 290M bytes.

The XL020+ features 4M bytes of RAM, expandable to 16M bytes. Hard-disk capacity ranges from 119M to 860M bytes. It can support 80 users.

Both systems have eight serial ports and two parallel ports. The XL020 costs from $21,000, and the XL020+ costs from $29,900.

Pinnacle Systems, 10355 Brockwood Road, Dallas, Texas 75238.

Data storage

Hewlett-Packard Co. has announced the **HP 7933XP** and the **HP 7935XP**, enhanced versions of its high-end HP 7933H and HP 7935H disk drives.

The enhancement is in the form of a 1M-byte semiconductor memory cache placed in the controller of the 404M-byte drives.

According to the vendor, the controller cache stores the most active data, reducing the number of reads from the disk surface.

The HP 7933XP costs $27,200, and the HP 7935XP costs $29,800. A field upgrade kit costs $3,500.

Hewlett-Packard, 1820 Embarcadero Road, Palo Alto, Calif. 94303.

Power supplies

RTE Deltec Corp. has introduced the **TPC series** of three-phase power conditioners in the 10-kVA to 45-kVA power range.

The models are stepping controllers that offer 50Hz or 60Hz operation. Features include one-cycle response time, surge-current capability to 100% for one cycle, the capability of supporting 100% unbalanced load at output and automatic disconnect in the event of an output overload or phase failure.

The TPC series models are priced starting at $8,595.

RTE Deltec, 2727 Kurtz St., San Diego, Calif. 92110.

Components

Intel Corp. has announced the **iSBC 186/530, iSBC 186/100, iSBC 186/410** and **iSBC Mem/601** single-board products for Multibus II systems.

The 186/530 board is a communications engine that allows multiprocessing systems to connect to Ethernet local-area networks. The 186/100 CPU board uses an 8M-byte 80186 processor.

The 186/410 serial communications computer provides up to 10 channels of serial communications for host communications or direct terminal I/O. The Mem/601 board is a universal-site, nonvolatile memory expansion board.

Prices are $1,995, $2,595, $2,395 and $850, respectively.

Intel, 5200 N.E. Elam, Ypung Pkwy., Hillsboro, Ore. 97123.

Auxiliary equipment

Marvel Metal Products Co. has introduced a **laser printer cabinet** said to provide a station for a laser printer as well as related supplies.

It has a slide-out drawer with a divided section for font cartridges and an adjustable shelf for storing preloaded paper cassettes.

The laser printer cabinet is priced at $279.

Marvel Metal Products, 3843 W. 43rd St., Chicago, Ill. 60632.

PRICE REDUCTIONS

Thoughtware, Inc. has reduced the price of its **Management Training Library** software system.

The Library is an integrated and interactive training system consisting of 13 programs said to assess individual management skills, organizational effectiveness and personal style interaction.

The programs run on the IBM Personal Computer, Personal Computer XT and AT.

The system is now priced at $999. Each program is available for $99 individually.

Thoughtware, Suite 1000A, 2699 S. Bayshore Drive, Coconut Grove, Fla. 33133.

For the computer professional, these three books applicable to IBM mainframes are a must. But like so many fine books on computer-related subjects—hardware, software, languages, database management, artificial intelligence, and personal computing—they could be costly. That's why you need The Library of Computer and Information Sciences.

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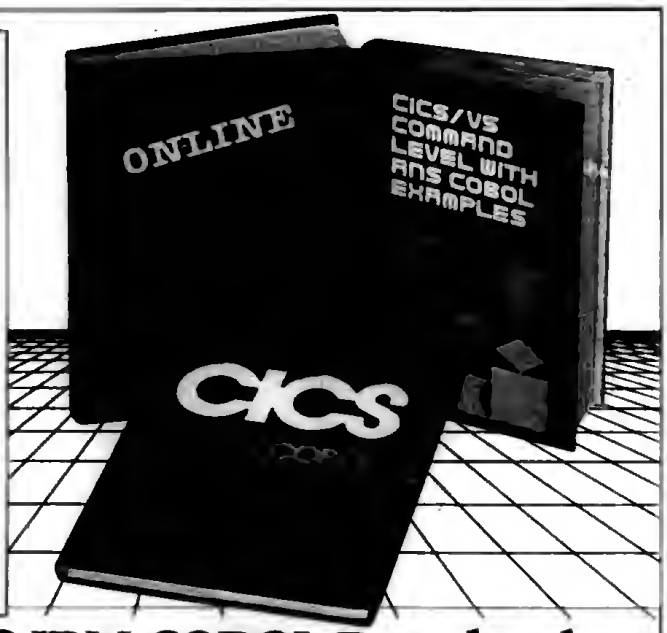

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CICS: Mastering Command Level Coding Using COBOL

William G. Bruno and Lois Bosland spell out how transactions are initiated, the role of internal CICS tables and work areas, how to handle abend processing and exceptional conditions, how to format screens using BMS, how to handle files, reading and browsing, adding and deleting, file pointers, and much more. Publisher's Price: $34.95

CICS/VS Command Level with ANS COBOL Examples

Pacifico A. Lim's practical handbook shows how to design and code in a CICS environment. All the tools and techniques necessary for on-line teleprocessing concepts, screen layout, BMS mapping, program components, the linkage section, pseudoconversational coding, and much more. Publisher's Price: $32.95

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Computerworld 5/5/86 3-DF7

At 19,200 bps, speed alone can be blinding.

In the race to claim the fastest high speed modem, many modem companies advocate basing your buying decision on one thing: speed. What's happened, unfortunately, is that modem purchasers are getting so caught up in modem speed they're losing sight of the most important consideration.

Modem performance. So before you rush into a high speed modem, ask yourself two simple questions. What level of performance do you really want out of a modem which operates at 19,200 bps? How much more efficient will it make you?

The answers to these two questions will lead you to one modem.

Introducing the Codex 2680.

It's the thoroughbred of 19.2 kbps modems. The superior performance of the Codex 2680 is achieved by utilizing enhanced 64-state 8-dimensional Trellis Coded Modulation (64 x 8 TCM), enabling Codex to position error-correcting data in a smaller signal constellation, thereby making it less susceptible to line disturbances.

In actual use the Codex 2680 delivers 99.9% error free data over more than 90% of standard 3002 D1 conditioned lines at 19.2 kbps.

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Speeds of 19.2 kbps allow you to realize dramatic increases in efficiency and productivity. Without increasing expenses or staff resources. And these savings add up. Fast. With its standard 2-channel multiplexer, you can eliminate extra lines. For example, by combining two separate 9600 bps circuits into one leased-line at 19,200 bps typical savings for a New York to LA link are greater than $24,000 per year.*

What's more, the Codex 2680 offers complete network management capabilities for monitoring and fault isolation. It can operate independently or with your central site Codex network management system, to ensure greater network availability. In short, it's a modem that's really a true network system resource.

It's all perfectly clear.

Another important feature of the Codex 2680 is the fact that it is shipping right now. Not tomorrow. Now.

If you still have questions or would like a product demonstration, simply call **1-800-426-1212, ext.227.** Or write Codex Corporation, Dept. 707-227, 20 Cabot Blvd., Mansfield, MA 02048.

The new Codex 2680 19,200 bps high speed modem.

The quicker you do it, the faster you'll be achieving what you really want out of a high speed modem. Performance.

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*Based on average installation and leasing charges for 3002 D1 circuits as of 10/85.

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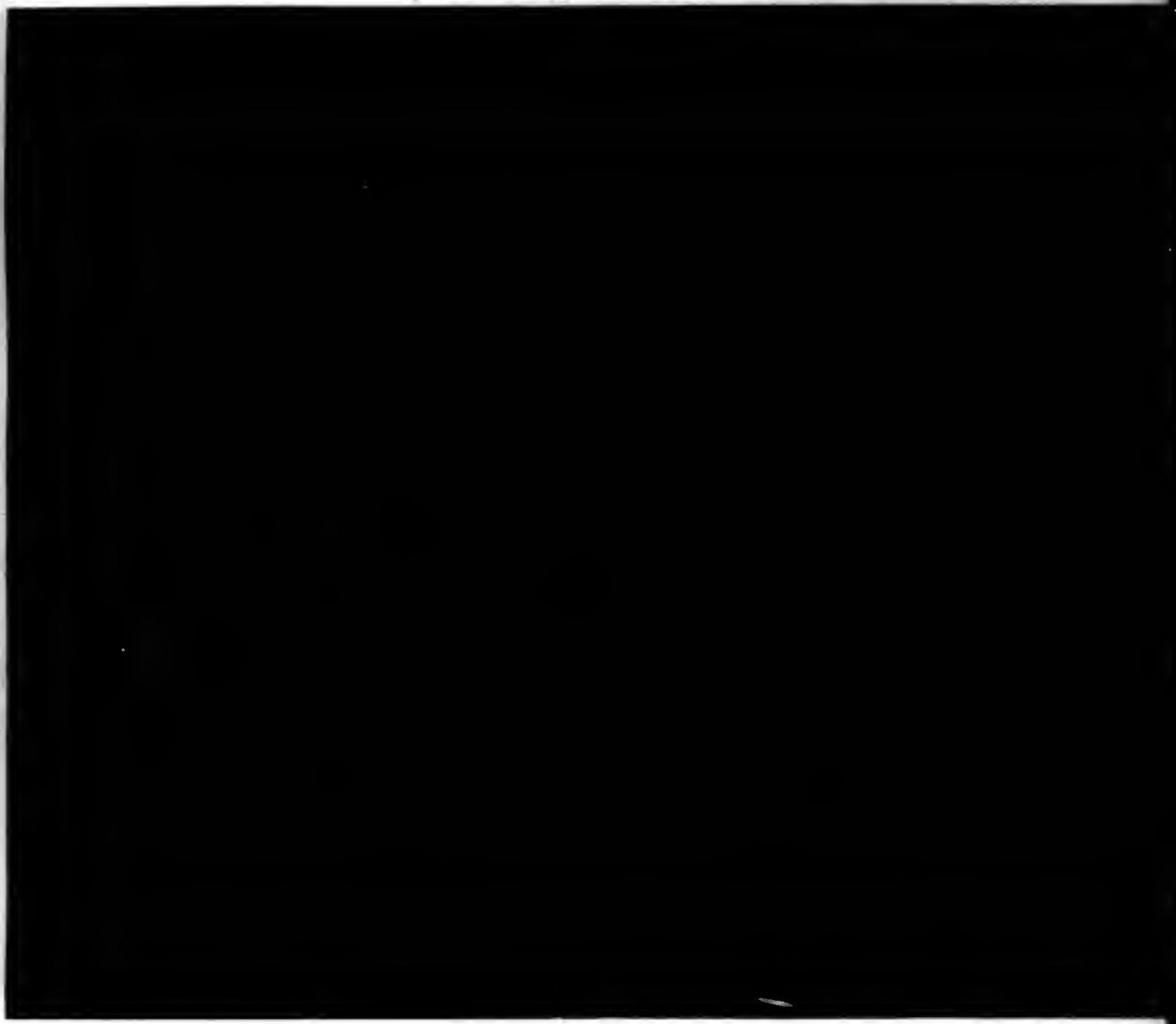

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AT&T offers another clear-cut reason for selecting the PC 6300 PLUS: Its highly defined, easy-to-read screen resolution. Compared to the IBM PC AT,* the PC 6300 PLUS text and graphics are four times sharper. Whether you're working on sales charts or preparing presentations, getting a better picture helps communicate the big picture.

Our non-glare screen and tilt-and-swivel monitor allow you to work comfortably on the PC 6300 PLUS for hours at a time. Its sleek design enables this unusually powerful PC to fit easily on your desk. Again, next to all the major competitors, AT&T's PC takes up 40% less desk space.

PERSONALITY PLUS

There's more to AT&T's PC 6300 PLUS than sheer power and comfortable design.

There's a side no one's ever seen before. It's a special feature on the PC 6300 PLUS called Simul-Task which lets you do things on a desktop computer that other PCs only hope to do someday: it works the way you work.

Say, for example, you are working on a spreadsheet and need the latest stock quotes. Simul-Task enables you to call up the new information and return to your original program in a fraction of the time it would normally take. You'll soon be able to activate Simul-Task.

When you are ready to protect your work, the PC 6300 PLUS enables you to eas-

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WITH THE MULTIPLE PERSONALITY.

ily make backup files while you continue on with other things. You can also schedule programs to run while you're away from your machine, so when you return, all the information will be waiting for you. The PC 6300 PLUS even affords you the convenience of sending and receiving electronic mail in the background while you run another program in the foreground.

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The combination of high performance and unique features makes the AT&T PC 6300 PLUS the personification of PC investment protection. Without abandoning the software you already own, you are bringing some extraordinary new capabilities to your desktop.

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NEWS

CALENDAR

WEEK OF MAY 11

MAY 11-14, NEW ORLEANS — **Association for Systems Management (ASM) 1986 Annual Systems Conference.** Contact: Richard B. McCaffrey, ASM, 24587 Bagley Road, Cleveland, Ohio 44138.

MAY 12-14, DENVER — **Optical Storage '86.** Contact: Cartlidge & Associates, Inc., Suite M-259, 1101 S. Winchester Blvd., San Jose, Calif. 95128.

MAY 12-14, MINNEAPOLIS — **PC FAB Expo/Trade Show.** Contact: Shows Department, PMS Industries, 1790 Hembree Road, Alpharetta, Ga. 30201.

MAY 14, WALTHAM, MASS. — **Algorithms and Their Practical Importance to the DP Professional.** Contact: Deborah Dupee, Association for Women in Computing Program Director, Suite 21, 66 Chiswick Road, Brookline, Mass. 02146.

WEEK OF MAY 18

MAY 19, ANNAPOLIS, MD. — **Mapics Users' Conference.** Contact: Salem Corp., 1654 Poplar Lane, Annapolis, Md. 21401.

MAY 19-21, HILTON HEAD, S.C. — **Audit Managers Symposium VII.** Contact: MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

MAY 19-21, SAN FRANCISCO — **Hammer Forum West: Change and Continuity in End-User Computing.** Contact: Michael Hammer, Hammer and Co., Five Cambridge Center, Cambridge, Mass. 02142.

MAY 19-21, SAN FRANCISCO — **ID Expo, The Conference and Exposition of Automatic Identification Systems and Keyless Data Entry.** Contact: Expocon Management Associates, 3695 Post Road, Southport, Conn. 06490.

MAY 19-22, PHILADELPHIA — **Lasers in Manufacturing: SPOT '86 Conference and Exhibits.** Contact: Kathleen Warren, Technical Activities Department, Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

MAY 20-22, ATLANTA — **Eastern Telecommunications Showcase.** Contact: Agnes M. Pavel, Program Director, U.S. Telecommunications Suppliers Association, Suite 1618, 333 N. Michigan Ave., Chicago, Ill. 60601.

MAY 20-23, ORLANDO, FLA. — **Techex '86 Americas: The Annual World Fair for Technology Exchange.** Contact: Anne E. Klenner, Dr. Dvorkovitz & Associates, P.O. Box 1748, Ormond Beach, Fla. 32075.

MAY 21-23, NEW YORK — **New York University Symposium on Information Technology and Management Strategy.** Contact: Kenneth C. Laudon, Graduate School of Business Administration, New York University, 90 Trinity Place, New York, N.Y. 10006.

WEEK OF MAY 25

MAY 28-29, WASHINGTON, D.C. — **Systems/34, 36 and 38 Users Show.** Contact: Andrew Wahtera, The Producers, 360 Merrimack St., Lawrence, Mass. 01843.

MAY 29-30, SAN FRANCISCO — **Unix In Focus.** Contact: International Data Corp., 3350 W. Bayshore Road, Palo Alto, Calif. 94303.

MAY 29-31, BLACKSBURG, VA. — **Personal Computer Interfacing For Scientific Instrument Automation.** Contact: Linda Leffel, Virginia Polytechnic Institute and State University, Blacksburg, Va. 24061.

MAY 30-JUNE 2, ATLANTA — **Society of Telecommunications Consultants Spring Conference.** Contact: STC Headquarters, Suite 1410, One Rockefeller Plaza, New York, N.Y. 10020.

WEEK OF JUNE 1

JUNE 2-5, DETROIT — **Vision '86 — Applied Machine Vision Conference and Exposition.** Contact: Vision '86 Public Relations, Machine Vision Association of the Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

JUNE 2-5, NASSAU BAY, TEXAS — **International Symposium on Ada Programming Language Applications for Space Station Development.** Contact: University of Houston — Clear Lake, 2700 Bay Area Blvd., Houston, Texas 77058.

JUNE 4-6, SAN DIEGO — **1986 National Educational Computing Conference.** Contact: Susan M. Zgliczynski, National Educational Computing Conference 1986, School of Education, University of San Diego, Alcala Park, San Diego, Calif. 92110.

JUNE 7, BEIJING — **China-Didacta '86: The International Trade Fair for Educational Equipment.** Contact: Swiss Industries Fair, Secretariat China Didacta '86, P.O. Box CH-4021, Basel, Switzerland.

WEEK OF JUNE 8

JUNE 9-11, MYRTLE BEACH, S.C. — **The Association of Small Computer Users in Education 19th Annual Summer Conference.** Contact: Jack Cundiff, Horry-Georgetown Technical College, Conway, S.C. 29526.

JUNE 9-11, NORCROSS, GA. — **Time and Motion Study Fundamentals.** Contact: Institute of Industrial Engineers Registrar, 25 Technology Park/Atlanta, Norcross, Ga. 30092.

JUNE 9-12, BOSTON — **Network Management/Technical Control**

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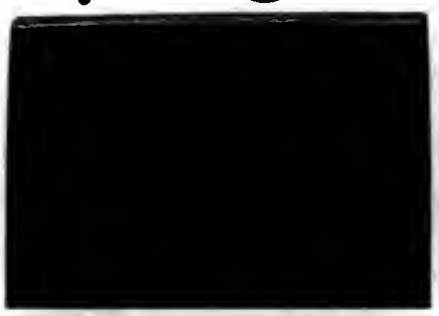
Forte PJ™ The original soft-loaded 3278/79 emulator for PCs. A powerful core product with IBM® compatible file transfer support. You can add mainframe graphics, 3270PC and more features as you need them.



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Conference and Exposition. Contact: CW/Conference Management Group, 375 Cochituate Road, Framingham, Mass. 01701.

JUNE 9-12, CHICAGO — **Com Lease Spring.** Contact: Show Management, 3825-I S. George Mason Drive, Falls Church, Va. 22041.

JUNE 9-13, SAN DIEGO — **MUMPS Users' Group 15th Annual Meeting.** Contact: MUMPS Users' Group, Suite 510, 4321 Hartwick Road, College Park, Md. 20740.

JUNE 10-13, ATLANTA — **Summer 1986 Unix Conference and Exhibition.** Contact: The Usenix Association Conference Office, P.O. Box 385, Sunset Beach, Calif. 90742.

WEEK OF JUNE 15

JUNE 16-20, CAMBRIDGE, MASS. — **Managing Information Technology: New Responsibilities in a Changing Environment.** Contact: Center for Information Systems Research, Sloan School of Management, MIT, E40-193, 77 Massachusetts Ave., Cambridge, Mass. 02139.

JUNE 17-18, PLYMOUTH, MICH. — **Robotic End Effectors: Design and Applications Seminar.** Contact: Mary Dombrowski, Special Programs Division, Robotics International of the Society of Manufacturing Engineers, One SME Drive, P.O. Box 930, Dearborn, Mich. 48121.

JUNE 17-19, ATLANTIC CITY — **Plas-Tech '86.** Contact: Delia Associates, P.O. Box 338, Delia Marketing Communications Center, Whitehouse, N.J. 08888.

JUNE 18-20, TOKYO — **Marketing Opportunities Seminar.** Contact: Agnes M. Pavel, Program Director, U.S. Telecommunications Suppliers Association, Suite 1618, 333 N. Michigan Ave., Chicago, Ill. 60601.

WEEK OF JUNE 22

JUNE 22-27, PHILADELPHIA — **Management Information Systems for Strategic Advantage.** Contact: The Registrar, Office of Executive Education, 200 Vance Hall, The Wharton School of the University of Pennsylvania, Philadelphia, Pa. 19104.

JUNE 23-25, ALBUQUERQUE, N.M. — **Integrated Fiber-Optic Technology Training.** Contact: Linda Castle, Optoelectronic System Consultants, P.O. Box 35525, Albuquerque, N.M. 87176.

JUNE 23-26, BOSTON — **ATE East '86.** Contact: Registrar, Morgan-Grampian Expositions Group, 1060 Commonwealth Ave., Boston, Mass. 02215.

JUNE 23-27, AMSTERDAM — **Fourth Annual European Fiber-Optic Communications and Local-Area Networks Exposition.** Contact: Cheryl MacDonald, Information Gatekeepers, 214 Harvard Ave., Boston, Mass. 02134.

JUNE 23-27, CHICAGO — **A/E/C Systems '86: The Computer and Management Show for the Design and Construction Industry.** Contact: Conference Director, A/E/C Systems '86, P.O. Box 11318, Newington, Conn. 06111.

JUNE 25-26, COATESVILLE, PA. — **Chester County Expo '86: CAD/CAM Conference from Micro to Mini.** Contact: Lee Smith, Central Chester County Vocational Technical School, 1635 E. Lincoln Highway, Coatesville, Pa. 19320.

WEEK OF JUNE 29

JULY 2-3, LAS VEGAS — **Full Meeting of the Design Automation Standards Subcommittee.** Contact: Ron Waxman, DASS Co-chairman, IBM FSD, 9500 Godwin Drive, Manassas, Va. 22110.

WEEK OF JULY 27

JULY 28-30, RENO, NEV. — **1986 Summer Computer Simulation Conference.** Contact: The Society for Computer Simulation, P.O. Box 17900, San Diego, Calif. 92117.

WEEK OF AUGUST 10

AUGUST 11-14, SNOWMASS, COLO. — **AM/FM International Ninth Annual Conference.** Contact: AM/FM International, Suite 820, 8775 E. Orchard Road, Englewood, Colo. 80111.

WEEK OF AUGUST 17

AUGUST 18-22, DALLAS — **Thirteenth Annual Conference on Computer Graphics and Interactive Techniques.** Contact: SIGGRAPH '86, Conference Management, Smith, Bucklin & Associates, Inc., 111 E. Wacker Drive, Chicago, Ill. 60601.

AUGUST 19-21, PHILADELPHIA — **Second Annual Physical and Electronic Security Symposium and Exposition.** Contact: Michael C. Otten, Booz, Allen and Hamilton, Inc., 4330 East-West Highway, Bethesda, Md. 20814.

WEEK OF AUGUST 24

AUGUST 26-28, SAN MATEO, CALIF. — **Interconnect '86.** Contact: Agnes M. Pavel, Program Director, U.S. Telecommunications Suppliers Association, Suite 1618, 333 N. Michigan Ave., Chicago, Ill. 60601.

WEEK OF SEPTEMBER 7

SEPTEMBER 9-12, ANTWERP, BELGIUM — **Second European Simulation Congress.** Contact: The Society for Computer Simulation, c/o Ghislain C. Vansteenkiste, Professor of Engineering, University of Ghent, Coupure Links 653, B-9000 Ghent, Belgium.

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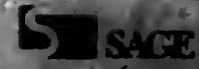

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COMPUTER INDUSTRY

Section begins on page 142

GEISCO changes tack, angles toward network applications

Company bailing out of remote services mart, president reaffirms

By Mitch Betts

ROCKVILLE, Md. — General Electric Information Services Co (GEISCO) executives have a strategy for rebounding from the dismal state of the remote computing services market, but it is a strategy that may take four or five years to pay off.

Since the collapse of the time-sharing and remote services markets in the late 1970s, the General Electric Co. division has been redirecting its business toward providing value-added network applications, such as electronic document interchange (EDI) and automated logistics and payments systems, for specific industries [CW, June 10, 1985].

Walter W. Williams, GEISCO's president, told *Computerworld* in a rare interview that the moves are designed to make strategic use of the firm's worldwide telecommunications network to enter high-growth markets and to avoid the pitfalls of GEISCO's traditional time-sharing business.

Painfully aware that the time-sharing business died because the falling cost of hardware enabled corporations to take data processing in-house, Williams confirmed that he wants to steer clear of that kind of problem in the future.

'A partner to the MIS manager'

"Corporate executives are making more sophisticated demands on MIS departments, so we've become a partner to the MIS manager, rather than the competitor of the past," Williams said. He noted that GEISCO's new business ventures are not dependent on the cost of hardware or storage.

GEISCO President Williams

W. James McNerney Jr., senior vice-president for marketing and U.S. sales operations, said GEISCO foresees strong growth in intercompany transactions, so it is targeting such applications as medical insurance payments and EDI.

For example, GEISCO recently was selected as the preferred EDI vendor by six trade associations in the paper and publishing industries.

Prodding users to recognize benefits

However, analysts and GEISCO officials agree that the firm is leading the market, often in the position of prodding users into recognizing the benefits of the new intercompany applications.

Mark Winther, an analyst with Link Resources Corp. in New York, said GEISCO is betting the company on markets that have not fully developed. EDI, for example, may not provide significant network traffic and revenue for four or five years, he said, and even then may have slim profit margins.

"Their strategy is to get wired into an industry, via EDI or something similar, and then add additional layers of services on top of that. Their profitability is only going to come when they start building things on top of that asset," Winther said.

GEISCO President Williams put it differently: "We're giving birth to pieces of business that are going to be multimillion-dollar markets." Asked if the parent company will support GEISCO while its new business develops, Williams said GE has given his unit "tremendous corporate support" and considers GEISCO an important part of its high-technology portfolio.

The revamped GEISCO is eschewing generic telecommunications services in favor of sophisticated applications that few MIS departments could handle, Williams said.

Consequently, GEISCO is at least tacitly ceding the market for such generic services as packet switching and basic electronic mail to its competitors, including GTE Telenet Communications Corp. and Tymnet/McDonnell Douglas Network Systems Co.

"GEISCO's strategy is obviously not to be the low-cost communications carrier but to be one of the applied communications vendors," Winther said. "Their strengths are in building intelligent applications, like building a cash management system, an order-entry system or a dealer network," he said.

Sophisticated information exchange

Winther agreed with GEISCO officials that most MIS departments will not find it cost-effective to undertake the kind of sophisticated information exchange applications that GEISCO is developing. "They're betting that these applications are beyond the pain threshold of the MIS department," he said.

GEISCO officials also claim that they are offering customers a highly reliable teleprocessing network with

See GEISCO page 114

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Unsure economy stunts progress of software industry

Analyst sees no return to earlier growth rates

By Alan Alper

NEW YORK — Uncertain economic conditions and the inability of many corporations to absorb existing technologies are among the main factors severely stunting growth in the software and services industry, according to the Mountain View, Calif., market research firm Input.

Speaking at a market research panel during ADAPSO's 13th Annual Computer Software and Services Financial Forum recently, Input founder and President Peter Cunningham said the information services industry grew by a paltry 17% last year to $48.5 billion.

Although still growing, that percentage pales considerably in contrast to the industry's historic growth rate of approximately 40% a year.

The prospect for a return to past growth rates this year seems slim, Cunningham said. "I don't see anything in the first quarter that suggests things will improve this year," he noted.

Technology glut

Chief among the reasons for slower industry growth is the continuing technology glut, Cunningham said, which has crimped many end users' abilities to absorb new software products and services.

Much of the new technology already introduced at many corporations has yet to demonstrate to management tangible productivity gains that improve financial results, he added.

Given the slower growth and an economic revival that failed to materialize, Input's Cunningham stated that, despite claims to the contrary, the software and services industry "is affected by the general economy."

In an interview following Cunningham's presentation, Pansophic Systems, Inc. President and Chief Operating Officer William Nelson agreed with the market researcher's analysis.

"The computer industry is a cyclical business," he said. "It's like the auto industry; every time there's a recession, the computer industry will be affected."

Purchase decision procedures stiffer

One reason for the software and services sector slowdown is that purchase decision procedures at many corporations have become drawn out, Nelson said.

Computer-related expenditures have become a large expense item at most corporations and have therefore come under increased scrutiny by top management, which needs cost-savings justifications before freeing the purse strings.

"Top executives no longer take the computer jock's word that the company needs a new program or system," Nelson said. "If the company has lived without it for the last six to nine months, the executive asks whether the company really needs it at all."

Processing services most affected

Processing services, the largest portion of the information services market, which in past years had grown better than 40% annually, appears to have been most affected by the industry slump. Revenue grew by only 14% to $17.3 billion, Cunningham noted. The professional services market grew only 19% to $7.4 billion last year, he added.

Turnkey software vendors posted collective revenues of $7.4 billion, an increase of only 16%. "These companies suffered the most from efforts by IBM and DEC," which offered competitively priced turnkey engineering systems, Cunningham explained.

While the software products sector grew by 20% in 1985 to $13.3 billion, last year's performance is weak in comparison to the 41% and 30% growth rates registered in 1983 and 1984, respectively.

"What happened here was that those companies which experienced explosive growth in past years ended up overshooting the market last year," Cunningham concluded.

EXECUTIVE REPORTS

Special Editorial Features

Every issue of Computerworld presents either a Product Spotlight or Executive Report. For advertisers it's still not too late to take advantage of one last topic for May!

In-house Publishing (Executive Report, May 26) Focus on the MIS manager's role in corporate electronic publishing. From host-based systems to departmental networks and stand-alone desktop publishing systems. Looks at integration in host-based systems and the role of the IBM PC and Apple Macintosh. Closing date May 9.

And here's what's scheduled for June and July:

ISSUE	TOPIC	CLOSING DATE
June 2	Word Processing Software (Product Spotlight)	May 16
June 16	The BUNCH Companies (Executive Report)	May 30
June 23	Personal Computer Graphics (Product Spotlight)	June 6
June 30	Integrated CIA Systems (Executive Report)	June 13
July 7	Data Security (Executive Report)	June 20
July 14	Expert Systems (Product Spotlight)	June 27
July 21	PBX Networks (Executive Report)	July 3
July 28	Management Training for DP Executives (Executive Report)	July 11

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PRODUCT SPOTLIGHTS

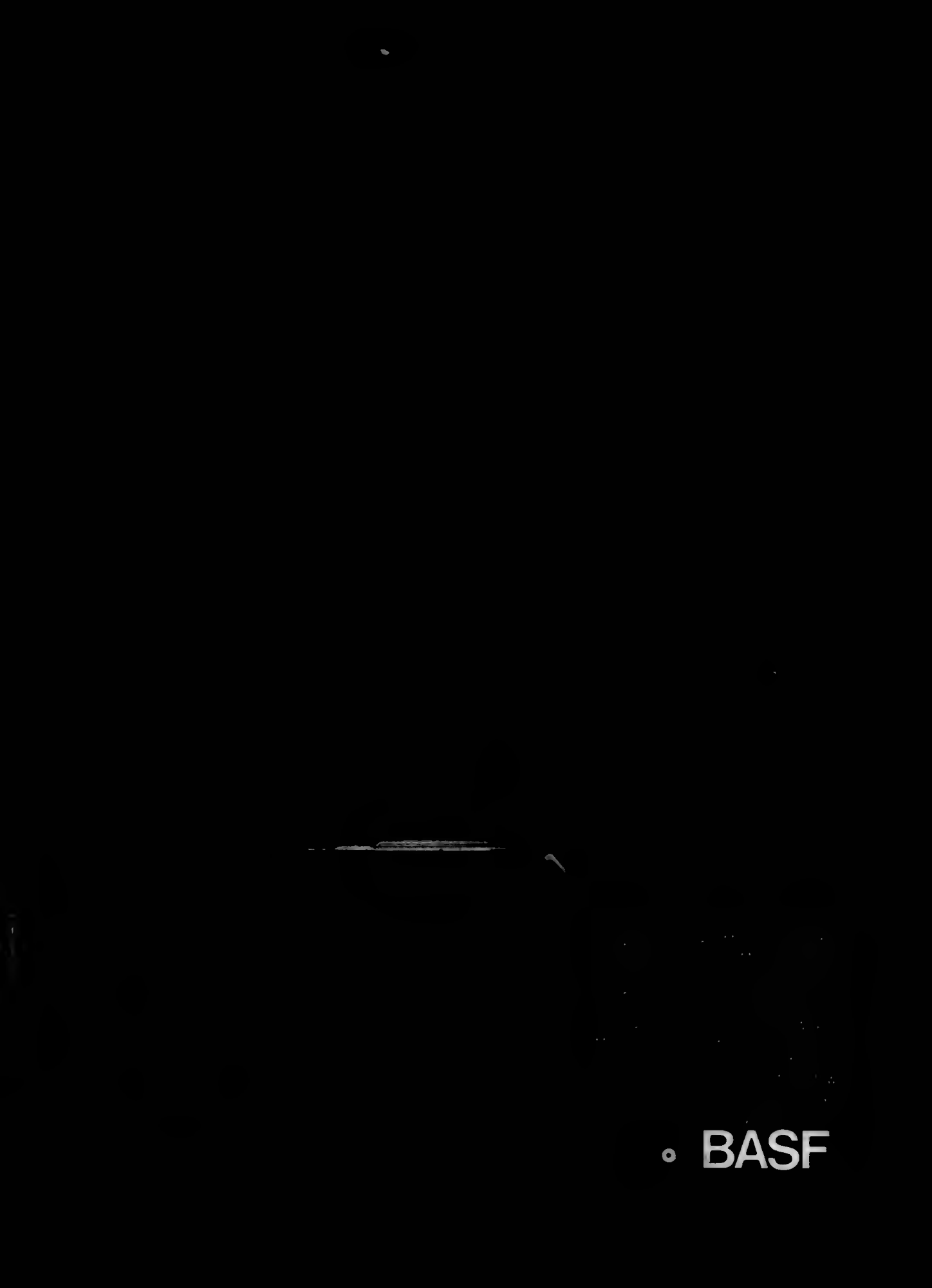
GEISCO angles toward networks

From page 113

global reach. Built-in redundancy and daily contacts with clients help to give the network an availability rating of 99.8%, 24 hours a day, according to Raymond W. Marshall, senior vice-president for technology operations.

However, analyst Winther said that GEISCO's network has lagged behind the other X.25 networks in supporting various conversion capabilities and putting intelligence in the nodes.

"So while it's the largest network in the world, in terms of its value-added features, it's not as wide-ranging as the others," Link Resources' Winther said.


BASF

Tandy, Apple show their age

From page 142

panded sales, but from a decrease in expenses, the result of automation and layoffs.

If sales continue their downward trend at Apple, what are the long-term prospects for a company whose two major microcomputers are not IBM compatible and whose Apple IIe uses an 8-bit technology introduced in 1977?

Without IBM Personal Computer compatibility, the Macintosh cannot win in the corporate marketplace, the only hot market in the industry right now. Apple is talking about linking its machines with other vendors' minicomputers and marketing the Macintosh to large businesses for desktop publishing.

However, most business micros still run in stand-alone mode, and IBM-compatible software is becoming increasingly available for IBM PC desktop publishing.

The Macintosh "simply has not obtained the momentum required to sustain it as a serious alternative to the IBM PC and compatibles in the business market," summarized industry analyst William Zachmann of International Data Corp. in a recent report.

'A tough Christmas for the Apple II'

As prices fall on the IBM PC and the Asian PC clones, both the Macintosh and Apple's cash-cow Apple II, an 8-bit machine that debuted in 1977, are likely to be severely harmed. "I suspect the last quarter of 1986 may make for a tough Christmas for the Apple II," Zachmann observed.

If Apple's long-term profitability seems questionable, the picture is bleaker at Tandy. Like Apple, Tandy cut its teeth in the home market. But Tandy's low-end offerings, such as the Color Computer II, are being blown away in the home market by more sophisticated newcomers such as Commodore Ltd.'s 128.

Worse yet, according to the Paine Webber report, Tandy's gamble for a share of the PC-compatible market — the Model 1000 — is selling almost solely to small business and home users.

Tandy feels retail pinch

Although Tandy never had to fight for retail shelf space, the company is now feeling the pinch of operating some 450 computer retail stores at a time when the retail shakeout is still under way.

To compound Tandy's misery, 1986 will be a year marked by intense PC price cutting. Some analysts estimate an IBM PC will cost about $1,500 by the year's end, and Asian-made PC clones will sell for $800 in December. Indicating that it is already feeling the heat, Tandy recently put its IBM Personal Computer XT work-alike on sale for $1,599.

While it may seem outrageous, the answer to Tandy's need for new proprietary PC technology could be rather simple: Acquire either Commodore or Atari Corp.

Amiga could give Macintosh a run

Commodore, in particular, is saddled with millions in debts and yet has a machine, the Amiga, that could, in the right hands, give the Macintosh a run for its money.

As for Apple, the solution for the short run is to give the Macintosh optional IBM compatibility and, in the long run, to replace the IIe with a Macintosh-like PC selling at about the same $1,000 price.

Apple, in fact, is expanding its offshore manufacturing capacity and may have just such a move in mind.

ITC throws hat into commercial marketplace ring

By Mitch Betts

McLEAN, Va. — Iverson Technology Corp. (ITC), a systems integrator best known for landing government contracts at military and intelligence agencies, has announced an expansion of its marketing team in order to enter the commercial marketplace.

"Our decision to expand into the commercial integration field will carry us into the Fortune 1,000 companies, as well as the total government market," said Donald D. Iverson, chairman and chief executive officer.

The systems integration firm has enjoyed rapid growth fueled by government contracts, primarily for systems that meet the Tempest security standard issued by the U.S. Department of Defense. Tempest equipment is shielded to prevent emissions of electromagnetic radiation that would disclose sensitive information.

The firm, founded by Iverson in 1978, went public in July 1985.

ITC stocked its marketing division with several former IBM salesmen. Kenneth E. Wylie, a former IBM and Masstor Systems Corp. marketing official, will head the division as senior vice-president of marketing.

Reporting to Wylie will be Barry S. Josephson, vice-president for federal marketing, and R. Joseph Market, vice-president for commercial marketing. Both men had extensive experience at IBM, ITC reported.

In addition, Edward K. Wachter joined ITC as vice-president of programs to manage a bid-and-proposal team and to establish the firm as an OEM of printers, plotters and optical character readers, ITC announced. Wachter came from Lockheed Electronic Co.'s Washington, D.C., office.

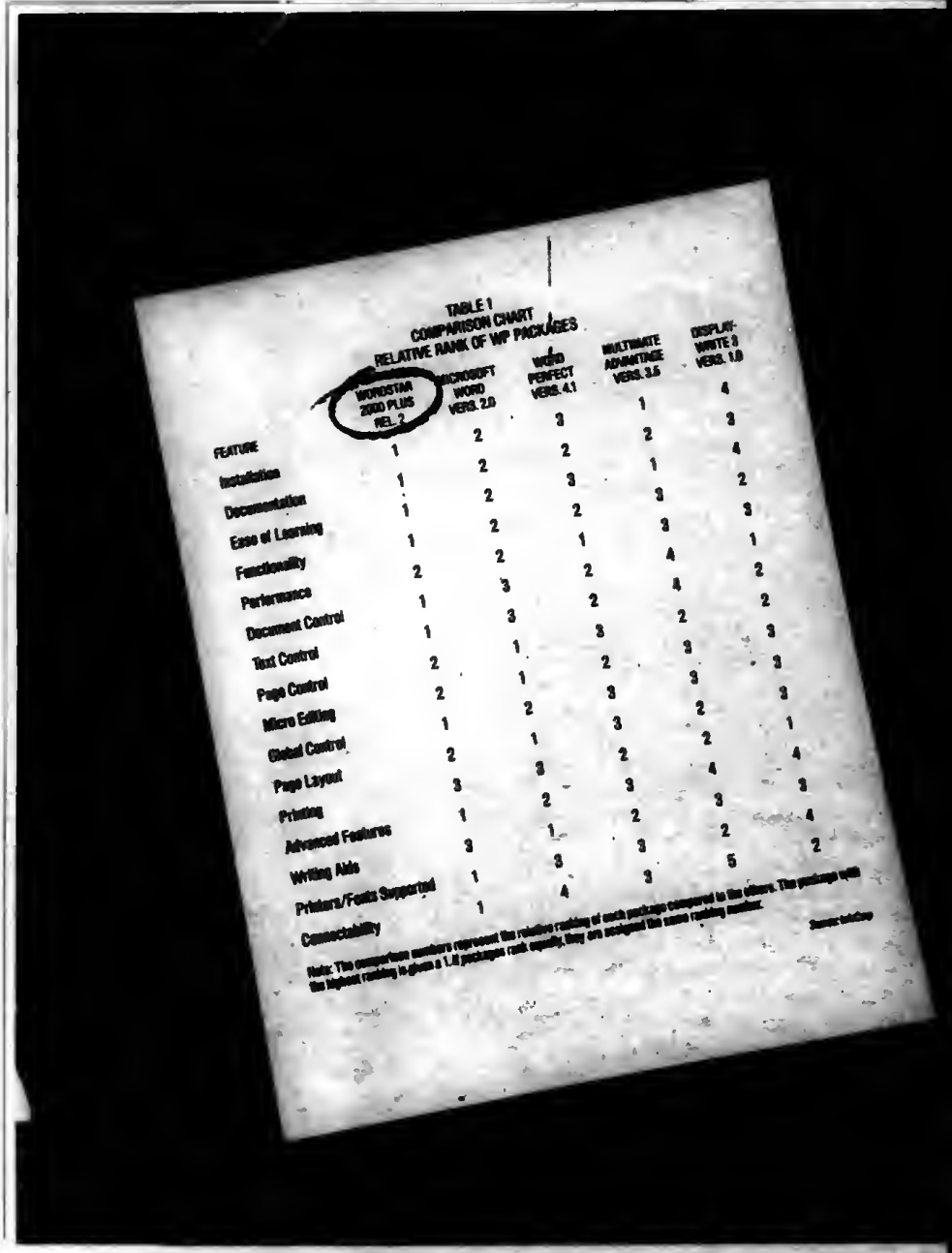


TABLE 1
COMPARISON CHART
RELATIVE RANK OF WP PACKAGES

FEATURE	WORDSTAR 2000 PLUS REL. 2	MICROSOFT WORD VERS. 2.0	WORD PERFECT VERS. 4.1	MULTIMATE ADVANTAGE VERS. 3.5	DISPLAY-WRITE 3 VERS. 1.0
Installation	1	2	3	1	4
Documentation	1	2	2	2	3
Ease of Learning	1	2	3	1	4
Functionality	1	2	2	3	3
Performance	2	3	1	4	2
Document Control	1	3	2	4	2
Text Control	1	3	3	2	3
Page Control	2	1	2	3	3
Micro Editing	2	1	3	3	3
Global Control	1	2	3	2	1
Page Layout	2	1	2	2	4
Printing	3	3	3	4	3
Advanced Features	1	2	2	3	4
Writing Aids	3	1	3	2	2
Printers/Fonts Supported	1	3	3	5	2
Connectability	1	4	3	3	3

Note: The comparison numbers represent the relative ranking of each package compared to the others. The packages with the highest ranking in shown a 1. If packages rank equally, they are assigned the same ranking number.

Source: Infoworld

NICKELS AND DIMES

Maxstor Systems Corp. reported a net loss of $9.8 million, or 51 cents per share, on revenue of $2.4 million for the year ended Dec. 31, 1985. This figure compares with a net loss of $17.4 million, or $1.11 per share, on revenue of $26.3 million in the previous year.

■

Icot Corp. announced revenue for the fourth quarter ended Feb. 1 of $12.4 million, compared with $5.2 million in the corresponding period a year earlier. Profits for the quarter were $1.7 million, or 18 cents per share, compared with $188,000, or 2 cents per share in the previous year.

■

Softech, Inc. reported revenue of $11.3 million for the third quarter of fiscal year 1986, a 26% increase over the same period a year earlier. Net income for the third quarter ended Feb. 28 was $578,717, or 16 cents per share, compared with 6 cents per share in the third quarter of the previous year.

■

L. M. Ericsson reported revenue for the year of $4.2 billion, up 11% over 1984. Income per share, after taxes paid and after estimated deferred taxes on appropriations, was $1.99, compared with $2.62 in the previous year.

Income before appropriations and taxes during 1985 amounted to $115 million, down from $206 million in 1984. Capital gains on sales of shares and property account for $43.7 million of this income.

■

Avant-Garde Computing, Inc. reported for the third quarter ended Jan. 31 a net loss of $1.3 million, or 35 cents per share, compared with earnings of $245,000, or 7 cents per share, for the third quarter of the previous fiscal year. Net revenue was $3.6 million for the quarter, compared with $5.3 million for the comparable period the year before.

■

Fortune Systems Corp. reported revenue for the first quarter ended March 31 of $10.7 million, compared with $9.8 million in the previous year. Profits were $345,000, or 2 cents per share, compared with a net loss of $3.8 million, or 18 cents per share, reported in the like quarter a year ago.

Olsen chides management

From page 142

'You've tolerated this all along and haven't done anything about it.' "

Olsen said DEC's ability to provide a family of compatible systems, all running the same software, was an important ingredient in the firm's stellar performance over the last nine months in the face of weak market conditions.

For the nine months ended March 29, DEC reported revenue of $5.4 billion, up 12% from the year-earlier period. Net income for the period increased 9.4% to $346.2 million.

Single-bus architecture

During Olsen's upbeat presentation, he extolled the virtues of DEC's use of a single-bus architecture, spanning the entire VAX line from the Microvax workstation to the firm's new high-end VAX 8000 series.

There is more software written to operate in VAX environments than for any other system's architecture, Olsen claimed.

"When the Russians want to steal a computer they steal one with the most software. That's why we get in trouble," Olsen joked.

'Dull organization'

The No. 2 computer maker, currently in favor on Wall Street, is essentially the same company that analysts excoriated just a couple of years ago for being complacent and obsolete, according to Olsen. "Two and three years ago they said we were a dull organization with a disciplined approach to computing. The PC was only a small part of what we do, and with that I was called too old," Olsen recalled. "Today, we have the same message. We may be dull, but today it psys off."

Olsen said DEC's disciplined approach to the design and manufacture of its new systems has paid dividends in the firm's ability to increase its operating margins from the 6%-to-8% range of a couple of years ago to 11% today.

"Of course, we don't discount like everyone else," Olsen said. "That is the most important part of margins, above anything else."

Operating margin low

DEC's operating margin, though trending upward, is still well below the firm's pre-1983 levels of 15% to 18%, noted Vice-President and Chief Operating Officer James Osterhoff.

With three new VAX systems — the 8800, 8300 and 8200 — at the beginning of their product life cycles, Olsen was optimistic regarding DEC's ability to continue the upward revenue and profit trends for the remainder of the year. He stopped short of offering any prognosis beyond saying, "There's no reason to think our profits will go down."

In anticipation of increased sales, Olsen said the firm would add personnel to its sales and support staffs. He declined to quantify the increased staffing levels, noting the hiring of additional sales representatives would depend on increased sales. A DEC spokesman said the firm has 6,000 sales representatives worldwide and a sales support team of 5,000.

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Sperry reports profit decrease, revenue increase of 15.5%

Blames slump, defense, aerospace operations

By Alan Alper

NEW YORK — Sperry Corp., citing the general slowdown in the computer industry and problems in its defense and aerospace businesses, last week reported that profits from continuing operations for fiscal year 1986 declined 3% to $280 million, or $4.92 a share. Revenue for the year ended March 31 increased by 15.5% to $5.7 billion.

For fiscal year 1986, net income was $46.8 million, or 82 cents per share, down 84% from last year's $286.7 million, or $5.15 per share. Sperry attributed its decline to a previously reported after-tax loss of $233.2 million, or $4.10 per share, resulting from the divestiture of its Sperry New Holland Division farm equipment business. For the fourth quarter, profits from continuing operations increased by 7.4% to $115.3 million, or $2.02 a share, while revenue jumped 13.5% to $1.8 billion.

In a prepared statement, Sperry Chairman and Chief Executive Gerald Probst said that in light of the computer industry slump and of internal problems in the firm's defense and aerospace operations, the firm's results were "satisfactory."

"Revenue and operating profit gains of more than 20% in our commercial computer operations were offset in part by lower profits of our defense and aerospace operations, which have experienced a strike and production problems that have largely been overcome," Probst said.

The Sperry chief executive said the firm was particularly pleased with growth in its micro products line and increasing evidence that its Unix effort is gaining momentum.

The firm projected that orders and shipments of its top-of-the-line 1100/90 would continue at last year's levels while low-end microproducts would increase significantly. The company declined to provide specific figures.

Probst warned that first-quarter fiscal year 1987 results would be below year-earlier levels because of a relatively strong performance in the comparable period and heavy order activity in the fourth quarter.

The company declined to project first-quarter results. In the first fiscal quarter of 1986, Sperry earned $51.5 million on restated revenue of $1.2 billion, according to a company spokesman.

Despite the continuing computer industry slump and uncertainties over the impact of proposed federal budgetary changes, Probst said the firm expected to achieve revenue and operating profit growth in fiscal year 1987.

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Issue: July 9 - Closing: May 30

COMPUTERWORLD FOCUS

Compaq sales increase by 48%, income up 80%

By Eric Bender

ATLANTA — Compaq Computer Corp. continues to show steady financial growth, achieving sales of $144 million and a net profit of $8.3 million during the quarter ended March 31. The figures represent a 48% sales increase and 80% income boost over the Houston-based personal computer supplier's corresponding figures for first-quarter 1985.

Discussing the results at Comdex/Spring last week, President Rod Canion said Compaq's gross margins had climbed to 39% in the latest quarter, up from 32% the year before, although the company had nearly doubled spending on sales and marketing, from $11.0 to $21.3 million.

Compaq cut pricing on its original Intel Corp. 8088-based lines in February and on most of its other models last month, but Canion said the price reductions had been planned considerably in advance and were part of normal industry cost trends.

Overall, the company's unit sales are growing slower than revenue because of the transition to the higher priced IBM Personal Computer AT-compatible systems, Canion said. He estimated that in overall industry sales of ATs and AT-compatibles during the first quarter of 1986, IBM took 70%, Compaq accounted for 26% and other vendors sold 4%.

"Last year there seemed to be a belief that it was a wide-open race," he commented. But aside from IBM, "We're the only company to take a significant share," he claimed.

Canion described the turmoil in the microcomputer distribution channel as a consolidation rather than a shakeout. "The dealer network will continue to get stronger" as additional capitalization becomes available, he predicted.

Although many see Compaq and other IBM-compatible suppliers at risk as IBM accelerates development cycles, Canion downplayed the threat. "We can go from the beginning of design to having a product in volume production in as little as six months and more reasonably nine months. Anything new is not going to impact the market in that time."

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BUSINESS NOTES

Intel vs. NEC copyright trial delayed a week

The copyright infringement trial between **Intel Corp.** and **NEC Electronics, Inc.** was postponed a week because of a scheduling conflict in U.S. District Court in San Jose, Calif. Jury selection is expected to begin by midweek.

■

The **U.S. Department of Commerce** last week issued a final ruling that Japanese producers indeed are dumping 64K-byte dynamic random-access memory (RAM) chips in the U.S. The action confirmed a preliminary ruling in December that Japanese firms were selling dynamic RAM chips at below-market value.

If the U.S. International Trade Commission confirms within 45 days that the alleged dumping has hurt the U.S. industry, the government will impose penalty duties ranging from 12% to 35% to offset the Japanese price advantage.

■

South Korean manufacturing conglomerate **Daewoo Corp.** has acquired a controlling interest in **Zymos Corp.**, a U.S. semiconductor vendor hit hard by the industry recession. The move will give Daewoo four of the seven seats on the Zymos board of directors.

The buy-in was made via the purchase of a block of 6.3 million shares of Zymos stock at an unspecified, but below-market price, Zymos said. That block of stock had been held by Intermedics, Inc., which gave up the stock in exchange for being relieved of lease obligations and a commitment to advance funds to Zymos.

■

Software Publishing Corp. said it will join the ranks of microcomputer software vendors dropping copy protection in response to corporate customer requests.

The Mountain View, Calif., firm will issue new, unprotected versions of its two Harvard product line programs, Harvard Total Product Manager and Harvard Presentation Graphics, in mid-May, a company spokeswoman said. Copy protection also will be dropped for Software Publishing's best-selling lower end PFS line of products in their next upgrades.

■

Isuzu Motors Ltd. announced recently an agreement with Dallas-based Electronic Data Systems Corp. under which Electronic Data Systems will process research and development information and handle all international data transmission for Isuzu. According to Isuzu, the deal arose after Electronic Data Systems was purchased by General Motors Corp., which owns 38.6% of Isuzu.

The agreement will take effect this month and was signed by Isuzu and Electronic Data System' Japanese subsidiary, EDS Japan, in April.

Microcomputer Memories goes bankrupt

Crowded market takes toll on disk drive maker

CHATSWORTH, Calif. — Caught in a market with too many competitors, 3½-in. disk drive manufacturer Microcomputer Memories, Inc. filed for protection under Chapter 11 of the Federal Bankruptcy Code late last month.

An early entrant in the market for 3½-in. disk drives, Microcomputer Memories was founded in 1982. Two years later the company went public just as the window for high-tech companies was beginning to close.

"It may not have been that they did anything wrong. It just sounds to me like a company that was caught in a market with too many competitors," said consultant Ray Freeman, of Freeman Associates, Inc. in Santa Barbara, Calif.

Microcomputer Memories shipped its first 10M-byte disk drives in May 1984. Design changes delayed the introduction of its 20M-byte disk drive in January 1985, and by then, the market had already taken its toll. "Two design changes were probably too big a capital hit for Microcomputer Memories at a time when capital resources were getting conservative," noted Dataquest, Inc. analyst Jim Moore.

One month after the 20M-byte disk drive introduction, the company laid off 28% of its work force. This February, 26 more employees were laid off.

For the fourth quarter ended March 31, Microcomputer Memories lost $2 million on sales of $2.4 million.

The failure of the disk drive manufacturer comes just as the market for 3½-in. disk drives appears to be ripening, analysts say. Recently, IBM announced it would support a 3½-in. floppy disk drive in its newly released laptop computer.

"The length of time that it took for IBM to endorse the 3½-in. product certainly slowed down the market growth in that area," Freeman said.

— **Maura McEnaney**

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Monday June 9 1986

9:00 am - 5:00 pm
Select One

T-1 Fundamentals of Network Control
Gabriel Kasperek, President, Kascom, Inc.
The basics of network control, including problem diagnosis and repair, maintenance and operational issues.

T-2 Integrated Voice/Data Corporate Networks
Roshan Lal Sharma, Sr. Scientist/Consultant, Telecommunications Network Science.
Network topologies and their synthesis, cost-effective network planning, future trends in intelligent networks and their impact on network management and control.

T-3 Cost Efficient Methods for Implementing New Tariffs
Cheryl A. Cushing, Manager, Reference Services, Connections Telecommunications, Inc.
Post-divestiture tariff rules, including LATAs and POPs with a comparison of major common-carrier tariffs, and evaluation of intra-LATA access alternatives and a review of new regulatory alternatives to traditional network costs.

T-4 ISDN I
Samuel Lynch, Senior Consultant, Zatyko Associates.
Definition and concepts, application standards and world-wide status, plus comparison of ISDN against OSI Reference Model as standard.

T-5 System Network Architecture I
Thomas Routt, Senior Consultant, Zatyko Associates.
Current status of IBM's communication architecture, new extensions such as LU 6.2/APPC and NETBIOS and IBM LANs as "defacto" standards.

U.S. attempts to take wind from Asian software pirates' sails

Battle moving from the legislative arena to the police station

By Edward Warner
Computerworld News Service

WASHINGTON, D.C. — When approximately 70 police officers swooped down on a flashy Hong Kong shopping arcade last month, they were looking for software pirates and — thanks to the help of a U.S. software firm — they knew where to find them.

In all, 17 people were arrested, and $130,000 worth of illegally copied software was confiscated in the raid, which resulted from a tip by Cambridge, Mass.-based Lotus Development Corp.

According to Lotus spokesman Michael Blaber, Lotus laid the groundwork for the raid by conducting its own investigation of the shopping arcade, proving to the Hong Kong police that roughly 40 stores were selling pirated Lotus software — some for as little as $20 per package.

Lotus' action, reportedly a first for a U.S. software vendor, indicates the increasing involvement of U.S. software vendors in the battle against software piracy and how that battle is moving in some nations from the legislative arena to the police station.

At the request of the U.S. Department of Commerce, many nations, including Taiwan and Hong Kong, have granted copyright protection to U.S. products. Now, both the U.S. government and U.S. software vendors are pushing to have those laws enforced.

The Commerce Department's approach has traditionally been to educate nations that tolerate rampant piracy on the need for copyright laws and copyright enforcement. Taiwanese officials, for instance, will soon receive a series of Commerce Department seminars on enforcing their revised copyright law, according to Commerce Department international economist Eileen Hill.

The Commerce Department, however, is also becoming increasingly willing to flex its muscle against those who steal U.S. intellectual property, including recordings, videotapes and computer software.

Last week, the agency launched a new offensive against nations where piracy is widespread, threatening those nations with possible U.S. trade sanctions, including denial of the preferential treatment provided under the Generalized System of Preferences (GSP). The GSP gives developing nations a discount on the tariff they pay to bring goods into the U.S. and is particularly important to such trade-dependent nations as South Korea and Taiwan.

In a further show of U.S. strength, South Korea is now under investigation by the Commerce Department for allegedly violating U.S. product copyrights, which South Korean law does not recognize.

When it comes to software piracy, most experts agree that Asian nations lead the pack. In China, which has no copyright laws at all, an estimated 10,000 pirated copies of Ashton-Tate's Dbase software were sold last year, according to the company's executive vice-president for international and domestic sales, Ron Posner.

> ***"The Commerce Department is becoming increasingly willing to flex its muscle against those who steal U.S. intellectual property."***

Lotus estimates losses at $100,000 a month to Asian pirates.

To combat Asian software piracy, Ashton-Tate, Lotus and Micropro International Corp. last year formed a Hoog Kong-based group called the Anti-Piracy Association.

The association, which also includes an Australian software distributor, is conducting a public relations war on Hong Kong-based piracy and is advising software publishers on how to get Hong Kong's copyright laws enforced, Posner said. Member vendors have also written to the world headquarters of their multinational corporate users urging them to warn their foreign affiliates against using pirated programs.

Posner, the chairman of an ADAPSO committee on international business practices, said he expects his committee, and ADAPSO itself, to become more involved in antipiracy efforts.

On the whole, however, the software vendors are battling international piracy behind the scenes, and only Lotus has successfully instigated a police raid. While Lotus sued U.S. users over what it claimed were pirated programs, overseas it has been more circumspect.

"It's easier to prove that a dealer knew he was violating the law," than to prove a user knew the software was pirated, Lotus spokesman Blaber concluded.

Control Your Network

Control Conference and Exposition

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T-6 Public/Private Data Network I
Daniel Zatyko, President, Zatyko Associates.
Current status of IBM's communication architecture, including applications and standards, and development of X.25 up to 1988 CCITT adoption.

T-7 MAP/TOP Systems Interconnection I
Donald Harring, Vice President, Zatyko Associates.
Status of seven layer OSI Reference Model as framework for future network compatibility, review of major vendor architecture - IBM, DEC, etc; migration to manufacturing automation and office communication protocols.

Tuesday, June 10, 1986

9:00 am - 5:00 pm
Select One

T-8 Planning the Network Control Center
Gabriel Kasperek, President, Kasmon, Inc.
User considerations in the design, equipment selection, software, and instrumentation of a network control center and related vendor issues.

T-9 Problem Resolution and Network Management in SNA Networks
Fred Cook, Senior Consultant Raytheon.
Techniques useful in analyzing problems in SNA networks. Topics include detailed SNA sequences, VTAM trace, NCCF, NPDA, NLDM and a review of critical parameters in NCP System Generation.

T-10 Network Modeling/ Design Workshop
Larry Rhue, Vice President, Connections Telecommunications Inc.
Network design calculations using MNDS PC-based design software and the complimentary Borland SIDEKICK package. Also included, queuing calculations in simple and complex network models, reflecting SDLC, BSC and X.25 protocols, statistical multiplexers and distributed concentrator networks.

T-11 ISDN II
Samuel Lynch, Senior Consultant, Zatyko Associates.
Technology and system/network/switching of ISDN, and certification and network testing, including 1986/87 field trials/user implementation.

T-12 System Network Architecture II
Thomas Routt, Senior Consultant, Zatyko Associates.
Technology and systems impact of SNA and relation to open architectures and protocols on networks from DEC and other vendors, and higher layer SNA services - DIA/DCA, PU 2.1, etc.

T-13 Public/Private Data Network II
Daniel Zatyko, President, Zatyko Associates.
Technology and systems impact of long distance, regional and in-house data networks, including message handling systems and office document interchange formats under different operating systems.

T-14 MAP/TOP Systems Interconnection II
Donald Harring, Vice President, Zatyko Associates.
Session will cover MAP/TOP common protocol connectivity, GM and Boeing programs, other vendor demos, user experiences and the implications of Corporation for Open Systems on MAP/TOP, vendor standards and products.

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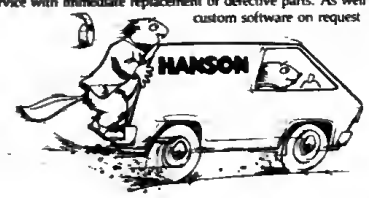

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4331-1	0.25	0.5 to 1
4331-11	0.38	1 to 2
4331-2	0.50	1 to 4
4341-B	0.52	1 to 4
4361-3	0.79	2 to 4
4341-10	0.75	2 to 4
4341-1	0.88	2 to 4
4341-11	1.1	2 to 4
4361-4	1.15	2 to 12
3031	1.2	2 to 8
4341-C	1.45	2 to 12
4341-11	1.4	4 to 16
4341-2	1.5	2 to 16
4341-12	1.65	2 to 16
3031-AP	2.0	2 to 8
4381-1	2.1	4 to 16
3032	2.5	2 to 8
4381-2	2.7	4 to 32
•4381-12	2.7	8 to 32
3033S	2.9	4 to 16
3083CX	3.3	8 to 32
•4381-13	3.6	8 to 32
3083E	4.2	8 to 32
3033N	4.3	4 to 16
3083EX	4.4	8 to 32
4381-3	4.5	8 to 32
3033UP	5.0	4 to 24
•4381-14	5.0	16 to 32
3083B	5.3	8 to 32
3083BX	5.6	8 to 32
3083J	6.0	8 to 32
3033MP	6.5	4 to 24
3033UP	8.5	4 to 24
3033U	9.0	8 to 32
3090 ID	9.8	16 to 32
•3090-120	10.5	32 to 64
3090J	11.0	16 to 48
3081BX	11.9	16 to 64
3081K	14.0	16 to 64
•3090-180	15.4	32 to 320
3081UX	15.5	16 to 64
3090H	28.0	32 to 64
3084QX	28.7	32 to 128
3090-300	29.4	64 to 320
•3090-400	52.9	128 to 640

• First Installation 1986

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470V/8	8.5	8 to 32
5840	5.4	16 to 64
5850	11.0	16 to 64
5860	14.0	16 to 64
5867	22.0	64 to 64
5868	28.0	32 to 128
5870	28.5	16 to 64
5880	38.0	32 to 128
†5880-200	38	64 to 256
†5880-300	38	64 to 256
†5880-600	64	128 to 512

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AS 8063	8.5	8 to 32
AS 8083	8.4	16 to 32
AS 9040	7.2	8 to 48
AS 9060	9	8 to 48
AS 9080	11.2	16 to 64
AS 9070	16.2	16 to 64
AS 9080	20	16 to 64
† AS XL-80	38	32 to 256
† AS XL-90	58	64 to 256

† Post Installation 1986

The above information is intended as a guideline for computer users on relative computer system instruction cycle times. All data have been derived from published documentation and represent reasonable estimates of average MIPS ratings. However, Randolph is not responsible for the accuracy of the MIPS data. Cycle times will vary based on hardware software configurations and system manufacturers' continuously modify computer models as design improvements in hardware and software arise.

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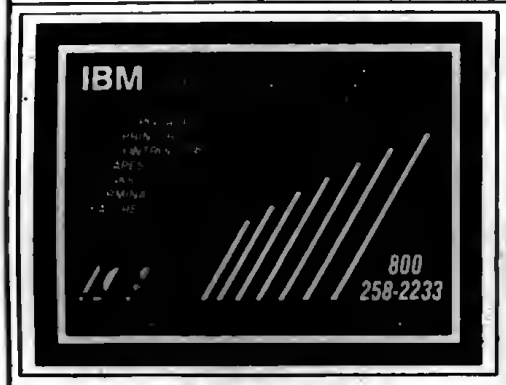

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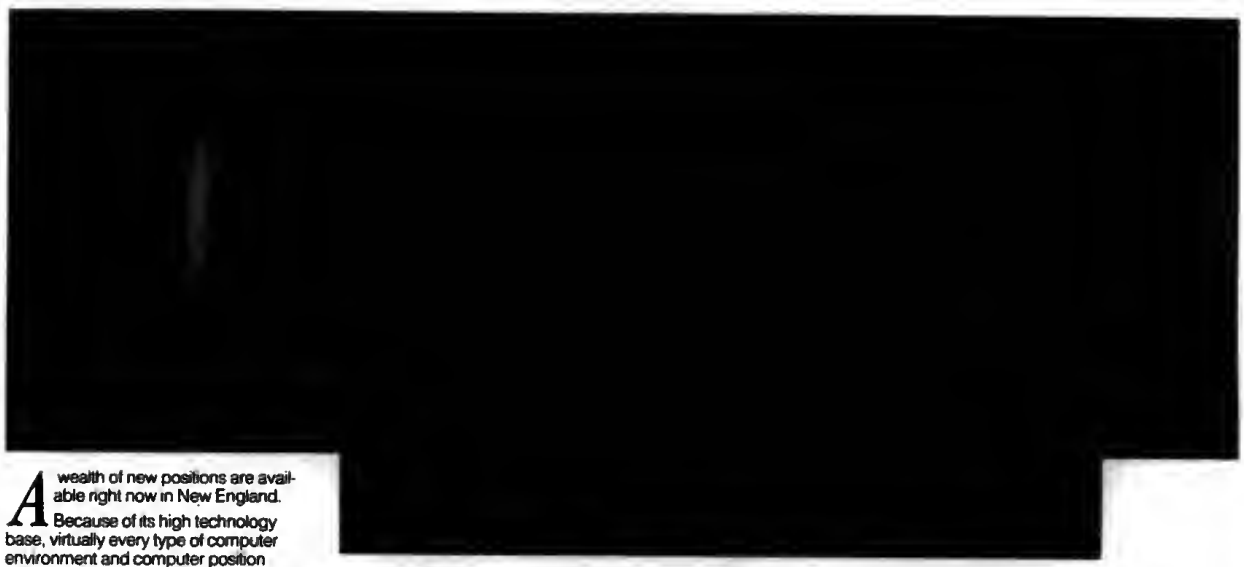

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Because of its high technology base, virtually every type of computer environment and computer position exists. With a strong economy, many new and some of the most prestigious firms throughout the area have retained Source Edp to help identify skilled computer professionals. They offer very generous salaries, benefit and relocation packages.

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To find out more about any position listed below — or others you might like to hear about — call Steve Jones toll-free day or night at 1-800-821-7700, extension 800 B. There's no cost or obligation to you and your inquiry will be held in strict confidence.

If unable to call, write: Steve Jones, Department C-4, Source Edp, P.O. Box 7100, Mountain View, CA 94039

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Director — Systems Development *(901-01)* Manage a group of engineering and business system development managers in a large manufacturing environment. High visibility in a fast-track company. Stratford. To $70,000 plus bonus.

Data Center Manager *(901-02)* Multi-billion dollar company with multiple mainframes and a big network environment seeks a computer operations leader to manage a staff of thirty and help plan future growth. Norwalk location. To $65,000.

Project Leader *(901-03)* You will lead the design and development team in new on-line data base systems development for purchasing, inventory replenishment and reporting systems. Norwalk location. To $48,000.

Programmer/Analysts *(901-04)* Participate in three years of new development for on-line data manufacturing, inventory control and financial applications. Opportunity to learn CICS in a large-scale MVS environment. Connecticut-based. To $34,000.

Programmer/Analysts — Project Leader Potential *(901-05)* You will participate in heavy analysis and development and take control of major project modules. Background should include four or more years IBM COBOL and some analysis. Connecticut location. To $34,000.

Data Base Analysts *(901-06)* Get involved in significant growth. Participate in the evaluation of new plans by evaluating and selecting DB2, ADABASE, IDMS and IMS. Fortune 500 company located in Southern Connecticut. To $50,000.

Technical Services Manager *(901-07)* Lead group of MVS Systems Programmers in generation, tuning and support of multiple 3083's with 3080's on order. Support IMS DB & DC, "PC" gateways, and big network environment. Stratford location. To $70,000.

Software Engineers *(901-08)* You will develop voice recognition products. Nonprofit-based company has future plans for major AI R & D effort. A degree in CS or EE plus two or more years experience in C, PASCAL or micro assemblers preferred. To $43,000.

Software Systems Development Manager *(901-09)* Norwalk-based company seeks individual to lead group responsible for operating systems and applications development of real-time closed loop applications in VAX/VMS/UNIX shop. To $55,000.

DP Manager/System 38 *(901-10)* Become key staff member in the implementation of manufacturing and other business applications for this $75 million Norwalk-based division of an international corporation. To $60,000.

Communications Network Manager *(901-11)* Lead network operations group in three locations. Evaluate new hardware and software network tools for the major financial services company. Trumbull location. To $52,000 plus bonus.

Software Engineer *(901-01)* Major hi-tech vendor seeks Software Engineer with two or more years data communications software development or support experience with protocols including Z780-3780, X.25, Ethernet and other LAN software. Be part of a software development team for mini/micro-based LAN systems. Connecticut location. To $42,000.

MVS Systems Programmer *(901-02)* Major Hartford-based Fortune 500 firm with suburban data center seeks experienced MVS Systems Programmers with at least two years of MVS sysgen, SMP and problem resolution. This is a rapidly expanding MVS/XA multiple-CPU environment. To $40,000.

Senior Programmer/Analyst *(901-04)* Ground floor opportunity in a new Check processing area. Large rapidly expanding financial institution in Hartford seeks an experienced MICR Programmer to head-up a new check processing area. Opportunity to become a Manager makes this position perfect for a bright, aggressive professional. To $36,000.

COBOL Programmers — Train to IMS DB/DC *(901-05)* One of the largest employers of data processing professionals in New England has multiple openings for OS/COBOL Programmers with one year experience. This firm offers extensive in-house training in IMS DB/DC and CICS programming skills. Hartford location. To $25,000.

Senior Programmer/Analysts — IMS DB/DC Applications Development *(901-06)* Learn IDMS. Fortune 50 conglomerate seeks talented, degreed professionals with strong OS/COBOL and IMS DB/DC experience to develop and maintain manufacturing, financial, and personnel systems for a Hartford-based division. Knowledge of MFS a plus. Opportunity to cross-train in IDMS. To $36,000.

Data Communications Manager *(901-07)* Major Hartford bank seeks experienced TC Analyst to plan and supervise migration to SNA/SDLC. Be part of key management on all telecommunications issues. To $40,000.

Systems Designer — Group Insurance *(901-09)* Major Hartford-based insurer is seeking a technical-oriented professional to head the acceptance testing and implementation phases of a multiple-stage defined contribution system. Problem-solving and organizational skills are a must. To $35,000.

Lead Systems Designer — Investment Products *(901-10)* Hartford-based financial organization seeks individual with four or more years systems analysis background to lead the development of a consolidated statement project: CICS or DL/1 data base experience is a plus. To $30,000.

Systems Team Leader *(901-11)* Major financial organization with a campus-like setting is seeking a Senior Systems Analyst ready to be promoted to a first line management position. The individual will be responsible for three Programmer/Analysts providing enhancement and production support for a group of on-line CICS and batch COBOL applications. Connecticut location. To $41,000.

Supervisor — Applications Programmers *(901-12)* Insurance leader seeks professionals with previous supervisory experience to supervise team of Programmer/Analysts on an IBM mainframe, on-line, IDMS development project. High visibility and exceptional advancement potential. Hartford location. To $30,000.

Massachusetts

Senior Sales Representative *(901-01)* Sell 4th generation language software and DBMS software to major IBM users in Southern New England. This well-known software vendor seeks an experienced Sales Representative with at least three years of successful software sales to the IBM mainframe marketplace. To $100,000.

Systems Manager *(901-02)* Manage multiple VAX/VMS computer systems in an environment implementing PC's, DBMS and Ethernet. You will have contact with users and will work with various software/hardware tools. A degree and minimum of three years in-depth VAX/VMS experience sought. Marlboro location. To $42,000.

Telecommunications Analyst *(901-03)* You will set-up a complete telecommunications network for a new data center. This will involve selecting and implementing the most up-to-date data and voice systems. Three to six years voice and data communications equipment support and installation desired. Boston location. To $35,000.

Artificial Intelligence Software Engineer *(901-04)* A major systems vendor developing artificial intelligence and natural language capabilities onto their next generation of computers seeks a Senior Software Engineer with eight or more years experience in lead development. Natick location. To $35,000.

Senior RPG Programmer/Analyst *(901-05)* Major North Dighton distributor seeks a Senior RPG Programmer/Analyst to develop major new systems for their multiple System/36 and 4381 environment. Excellent opportunity to move into a large system environment. Management potential. Three or more years RPG III desired. To $37,000.

EDP Auditor *(901-06)* Major Framingham manufacturer with a newly implemented international distributed computer network seeks EDP Auditor to create and implement controls. European travel. Two or more years EDP Audit in an IBM OS/MVS environment desired. To $44,000.

Information Systems Director *(901-07)* Leading company is seeking an individual to lead our expanding data center. You will continue the expansion of distributed processing, the use of IDMS and 4th generation languages, and an information center. Ten years of experience including data center management, COBOL programming, IDMS knowledge, and a BS/BA degree is desired. To $75,000.

FORTRAN Software Engineer *(901-08)* Work with a variety of high-level languages including FORTRAN, PASCAL and C developing graphic interface software. These software products will connect mini and micro processing capabilities into one very large real-time processing system. Two to eight years of R/T software experience and a technical degree preferred. Wayland location. To $43,000.

Technical Support Consultant *(901-09)* A successful, medium-sized communications products company in Billerica seeks a Technical Support Consultant to diagnose and coordinate the technical solution to problems arising with LAN and other network products. This is a ground floor position. Three or more years experience developing or supporting communication hardware or software and a BS or BA degree is desired. To $41,000.

Project Leader *(901-10)* A leading financial services company is undergoing a major new development project. You will lead a fifteen person team in developing a completely new IDMS/R-based on-line system. An aggressive self-starter with a track record of successful systems development in an IBM/DBMS environment is desired. Boston. To $48,000.

IMS DBA *(901-14)* A fast growing IMS shop to the Boston area seeks one Intermediate and one Senior IMS DBA to participate in new systems development. You'll receive excellent benefits which includes an on-site health club. To $55,000.

Communication Product Manager *(901-12)* Develop both product and marketing strategy for communication products to be utilized primarily in a PC to mainframe environment. Knowledge of PC's, IBM mainframes and communication software desired. BS/BA and advanced degree preferred. Billerica location. To $48,000.

IBM Systems Programmers (6) — New Data Center *(901-13)* New subsidiary of major corporation in Boston is building a new data center and is staffing a technical support group from scratch. Ground floor opportunities are available to Systems Programmers experienced in MVS, CICS, VTAM/NCP, or VSAM/DASD. To $48,000.

Information Center Specialist *(901-11)* Prestigious investment Company in Boston seeks an experienced INFO Center Specialist to lead a three-person team. This is a high visibility position offering daily contact with senior executives. Strong knowledge of information center tools in an IBM environment, and the ability to work in a fast paced environment is desired. Securities industry knowledge a plus. To $42,000.

Programmer/Analysts IDS-II *(901-16)* Fast growing Boston suburban company which develops large-scale data base systems for the U.S. Government has several openings for individuals with three or more years experience on Honeywell/COBOL systems with IDS-II. Rapid promotion potential to Project Leader. Full relocation package. To $48,000.

Life Insurance System *(901-06)* Extensive career growth available on major new development project at prestigious insurer. Be a part of a total rewrite of all individual administration systems. Suburban Massachusetts location. To $42,000.

New Hampshire/Vermont

Senior Technical Writer *(901-15)* Leading Northern New England computer vendor, currently developing advanced UNIX-based supermini computers is seeking an individual to lead its technical documentation group. Three or more years experience in UNIX internals preferred. Excellent growth potential. To $30,000.

RPG III Programmer/Analyst — Ski Country *(901-17)* An unusual opportunity to live in the heart of Vermont Ski Country and work premier resort. Top technical environment and professional challenge with excellent benefits, free skiing, and full relocation. Prefer two to five years System/38, RPG III experience with business applications. To $35,000.

Software Engineer — Networking *(901-18)* New Corporate R&D center for major vendor. Join the development team at the most advanced networking and communications products. Five or more years software engineering and experience with IBM protocols, LAN's, or DECNET are desired. Excellent benefits and relocation. To $54,000.

Systems Architect *(901-19)* Become the primary Systems Architect for the design and development of a new, fully transportable 4th generation language implemented on supermini and IBM PC's. You will be involved with design user interface and the coordination of a broad base of engineering resources. Full relocation. To $78,000.

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The Applied Physics Laboratory (APL), a high-technology R & D organization located midway between Baltimore and Washington, has an immediate need for a Lead Systems Programmer. This individual would provide a lead role in evaluating, installing, testing, and enhancing MVS system software. In addition, the successful candidate should possess good communications skills and be capable of supervising other systems programmers. Minimum requirements include a BS degree in a technical discipline or its equivalent in education and experience, plus two years of experience with MVS operating system software or related MVS system software.

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The Schuler Resources Center furnishes the University with central computing facilities for instructional, research, and administrative functions. Presently installed is a VAX 11/780 and a VAX 11/785 running VMS, an IBM 4341-2 running VM/CMS, and a Gould PN9080 running UNIX. All of the host computers on campus are being interconnected with a comprehensive data network, which will in turn be linked to state and national computer networks. The Resource Center network will provide campus-wide access to these facilities via personal computers.

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Data Processing Opportunities

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Data Security Analyst

This position calls for a Bachelor's degree and four years data processing experience including system design, COBOL, and JCL. Knowledge of ACF2, SAS, and IDMS coupled with strong communication skills is desirable. Your expertise will be needed to technically and operationally support the data security and disaster recovery functions and to perform analysis, design, and programming activities. This position also requires interfacing with CSD and user personnel to resolve security related problems.

Application Programmer Analysts

You should have a Bachelor's degree, 2-6 years of relevant system design and programming experience, and a knowledge of ANS COBOL, IBM OS/VS JCL, TSO/ISPF, CICS, VSAM and structured programming techniques. Working knowledge of IDMS Data Base, SAS, FOCUS, DYL 280 is highly desirable. You'll work on the analysis, design, development, and support of operations information systems and programs. Strong oral and written communications skills a must.

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QUALIFICATIONS: This position requires a wide range of verifiable professional capabilities and technical expertise (i.e. junior/senior technician, project manager, assessed data processing manager) reflected by education, by at least 8-10 years of intensive industrial experience. Degree or equivalent experience. Local, municipal, county, or international government agency experience desirable but not required. Bilingual (English/Spanish) fluency is an asset but not a requirement.

DUTIES: The Director reports directly to Commissioner's Court and has budget responsibilities for the computer facility and information center. The Director will solely assume leadership and responsibility for the total information support services operations including direct, "hands on" accomplishment of systems technical support, traditional production room functions, hardware and software trouble-shooting, and local and remote user interface, education, and continuing education. The Director should have a conceptual ability and capacity to readily adapt to our specific technical and application environment. The Director will be instrumental in the development of new procedures, policies, routines and work functions resulting from creative application automation in a growth progressive and quality-oriented county government. Local and regional travel. On 24-hour call.

POSITION INFORMATION: Salary range is $28,000 - $34,500 (depending on experience), plus attractive benefits. Position closing date is 6/2/86 at 5 PM. Morning at earliest availability.

TO APPLY: Send letter of application (indicating earliest availability), resume, and 5 professional and technical references (name, address, and telephone number) to: Human Resources Office (Special), County of Burnet, 220 S. Pierce St., Burnet, TX 78611. Applicants are encouraged to optionally provide (1) an appendix which may disclose and illustrate a broad range of technical experiences and expertise, and (2) a technical sheet which discloses the applicant's capacity to perform systems technical support for specific computer systems.

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NETWORK ARCHITECT to lead team in conceptual design/prototype of new products. Will also work to improve methodology/process of SW development and be guru on SW technology & standards such as CCITT x400 & ISO OSI. Reqs. 8+ yrs. exper. as an architect for a major network or mainframe vendor. Plus exper. with various mainframes, PC's and mini's. Familiarity with SNA, DECNET, File Transfer, Message Handling & Directory Services.

SYSTEMS PROG (CICS/DISOSS) reqs. 2-5 yrs. with CICS plus exper. with assembler prog., DISOSS, PC/Host Connects, SMP/E or SMP-4. Networks and VTAM.

SW PROJ LEADER to lead design/implementation of heterogeneous distributed office automation product development projects. Reqs. MSCS 2+ yrs. SW proj. leadership and 2+ yrs. relevant systems SW development exper.

TECHNICAL INSTRUCTOR/DEVELOPER to develop/present data communications courses to technical audiences nationwide. You will work with engineering, and research technical publications to define course content, then develop courses independently. Reqs. exper. with data communications and a proven track record with competency-based learning/instructional design. Ideal cand. will have worked with a variety of delivery methods and have hands-on programming exper.

TECHNICAL WRITERS to write/edit user documentation for communications SW. Reqs. solid exper. writing for a technical audience.

TECH SUPPORT ANALYST to provide on-site/telephone support to our customers. Resps. include installation and ongoing support in the areas of problem isolation and analysis. Reqs. 4+ yrs. technical exper. in an IBM environment. IBM assembler. Exper. with MVS critical. VM, VAX, VS, CICS, DISOSS desirable.

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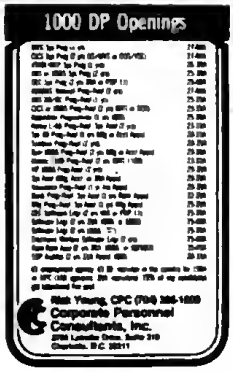

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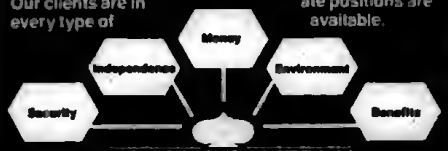

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Akers predicts 'demanding year'

From page 142

will introduce software, storage and communications enhancements.

• Supercomputing. Akers said IBM "expects to participate to a greater degree" in supercomputing applications. He cited strong response to the vector processing option on 3090 series mainframes from many customers, including Houston-based oil industry customers.

• Software source code. Responding to an independent software developer who claimed that IBM has not followed its own guidelines for easing the transition from its formerly unprotected source code, Akers defended IBM's 1983 decision to make its code proprietary. "We feel a tremendous obligation to serve our customers, but we feel no obligation to serve our competitors," he said.

• PC Convertible compatibility. Akers refused any comment on plans to make the recently announced laptop compatible with 5¼-in. drives.

Most shareholder attention focused on IBM's continued business in racially torn South Africa. Refusing to follow the recent withdrawals by corporations such as AT&T [CW, April 21], General Electric Corp. and Microsoft Corp. (see story below), IBM stockholders overwhelmingly defeated a shareholder proposal calling for IBM to end its South African business by the end of the year. IBM's board of directors had recommended the proposal be rejected, and it was supported by only 7% of the shares voted.

Both Akers and retiring Chairman John R. Opel said that IBM feels it is a progressive force for change in South Africa's separatist apartheid system. Opel said less than 0.5% of IBM's worldwide revenue comes from sales in South Africa and noted that IBM has reduced its work force there by 400 to 1,500 in the last 18 months.

"As a force for change, presence is better than absence," Opel said. He later admitted, however, that IBM believes "it is not within our power as a corporation to change political events in that country."

Microsoft severs S. Africa ties

REDMOND, Wash. — Microsoft Corp. recently severed business ties with South Africa because the firm said it believes its withdrawal will have more political impact in ending racial segregation there than its economic participation has.

Microsoft, which sold about $100,000 worth of software per year in the country, ended its agreement with South African computer distributor Automated Office Systems. Automated Office Systems currently distributes software from other leading U.S. vendors such as Lotus Development Corp., Micropro International Corp. and Borland International, Inc. as well as peripherals from firms such as AST Research, Inc.

Robert O'Rear, Microsoft's director of intercontinental operations, urged other U.S. computer firms to follow Microsoft's lead. "That's our hope," he said. "If we all join forces, we will send a stronger message."

Formerly, Microsoft donated its profits from South African sales to a charity, the American Friends Service Committee, that seeks to end apartheid.

"The pressure we have tried to bring as a participant hasn't had the impact that we had hoped," O'Rear said. "We have tried to change things by diplomatic means for as long as we thought we could."

O'Rear's comments were in sharp contrast to those from AT&T officials, who downplayed the significance of their firm's similar action.

BUSINESS NOTES

Memorex lays off 300 employees

Citing increased competition within the IBM mainframe disk drive market, **Memorex Corp.** last week laid off 300 workers in its Santa Clara, Calif., facilities. The layoffs affect workers in manufacturing, marketing and administration. Parent company Burroughs Corp. recentiy pointed to Memorex as one source of its 66% decline in profits for the quarter ending March 31.

■

Apollo Computer, Inc. signed a $50 million OEM agreement with longtime customer **Mentor Graphics Corp.** of Beaverton, Ore. The one-year, renewable contract allows Mentor to resell Apollo's recently introduced workstations, the low-end Series 3000 Personal Workstatioo and the high-end DN570, in its line of computer-aided engineering and design systems.

■

In an unusual hookup between an artificial intelligence software developer and a workstation vendor, **Intellicorp and Sun Microsystems, Inc.** announced they will jointly market Intellicorp's Knowledge Engineering Environment on Sun-3 workstations. The Intellicorp AI development software previously ran only on dedicated LISP workstations. Intellicorp Chairman and CEO Tom Kehler called the pact "a significant step in our strategy of making our development and delivery products widely available on general-purpose workstations."

■

Continuing its pattern of joint ventures in computer integrated manufacturing (CIM), **IBM's** manufacturing systems division has teamed up with **Cincinnati Milacron, Inc.**, a vendor of factory floor controllers, to develop CIM software. The software is intended for workstations such as the IBM Industrial Computer.

CDC turnabout impressive, but investors still cautious

ACTIVE ISSUES
Kathy Porteus

Is now the time to reconsider Control Data Corp. (CDA — 22)?

investors should be familiar with CDC's plight of last year when substantial losses, primarily in its computer businesses, forced the company to cancel a public offering, technically default on short-term loans and dramatically streamline operations. Investors may be less acquainted with the progress In CDC's turnaround.

Two weeks ago, CDC reported a first-quarter loss of $21.2 million, representing a significant improvement over last year's fourth-quarter losses of $297.2 million that included $121 million in special charges for restructuring. According to analysts, CDC's peripheral products business experienced a strong pickup during the March quarter. Also, the company's financial subsidiary, Commercial Credit Co., is beginning to ahow the benefits of a major restructuring.

Soch positive signs cause some analysts to favor CDC as an investment opportunity.

"I see considerable improvements in CDC's stock price," says Gerard Hallaren, vice-president with Brean Murray Foster Securities, who currentiy recommends purchasing CDC stock. "By year-end 1986, the company's strategies will be a lot clearer than they are now." According to Hallaren, investors currentiy overlook how CDC is confronting Japanese competitors of its high-end disk products, how its mainframe business continues attracting new customers and how its Commercial Credit subsidiary provides a "safety net" worth at least $19 a share.

Porteus is president of Strand Research Associates, a Centerville, Mass.-based company that provides customized research services for financial and high-tech firms.

"Japanese competition has been taking market share from CDC for a number of years," Hallaren says, "but I think that's going to reverse very soon." Such a change reflects high-reliability product ratings from customers and the rising value of the Japanese yen, which has thwarted Japanese aggressive pricing policies. Hallaren also cites improvements in CDC's mainframe business, in which 33% of last year's shipments went to new customers "at a time when the press on CDC was horrible."

Matt Meehan, vice-president with Salomon Brothers, Inc., is also positive about CDC's prospects, but he recentiy changed his recommendation from "accumulate shares" to "hold." He says he still believes that "the stock has the potential for considerable upside movement over the long term."

Nevertheless, Meehan expresses concern over a decline in computer system orders and certain financing issues that should have been resolved a month ago. These issues include CDC's sale of its Ticketron entertainment and wagering business, completion of bank agreements regarding the company's debt and the sale of public or private debt. "Indeed, when these things come together," Meehan says, "I would go back in on a more positive note."

Most analysts estimate CDC will break even in its current fiscal year ending Dec. 31, 1986, assuming that the company will return to profitability in the second half. But because of CDC's multifaceted reworking of its core businesses, financial subsidiary and bank agreements, many analysts and investors still prefer watching CDC's recovery process from the sidelines.

"Key to Control Data's return to profitability this year," says Gary Blauer, securities analyst with Dain Bosworth & Co., "is a recovery in the industry as a whole." Although Blauer acknowledges improvements in the company's ability to win in competitive situations, he says he feels "no hurry to jump in because Control Data's turnaround is still too far out."

MSA agrees to acquire financial, human resources software firm

ATLANTA — Management Science America, Inc. (MSA) said last week it agreed in principle to acquire Ioformation Associates, Inc., a Rochester, N.Y.-based vendor of financial and human resources software for the higher education institution market. The agreement is for MSA to pay $15 million in cash.

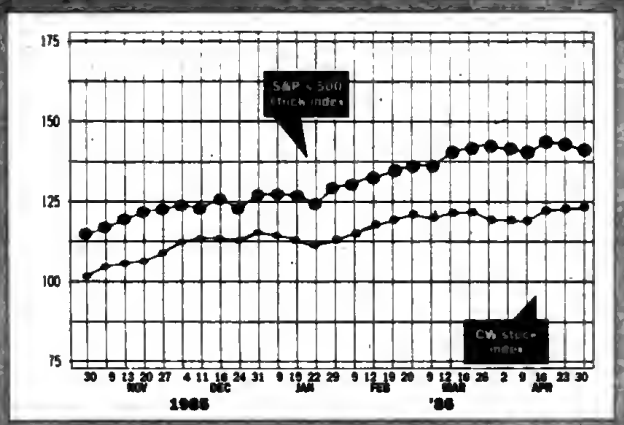
It was the second such announcement for MSA within a few weeks. Last month, MSA said it agreed to acquire RTS Ltd., a Dublin-based vendor of manufacturing and financial software for IBM's System/36 and 38 minicomputers [CW, April 7].

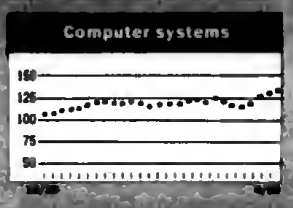
MSA will continue to expand its product line through acquisition and internally funded research and development, the company said.

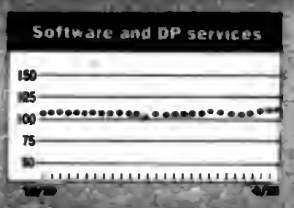
Information Associates' flagship product line is the Series 2, composed of software systems for financial records, student information, human resources and alumni records development, that operates on IBM mainframes or Digital Equipment Corp. VAX computers.

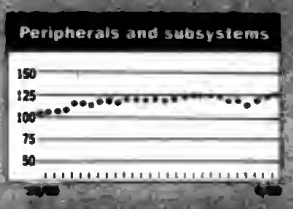
MITCHELL J. MAYES

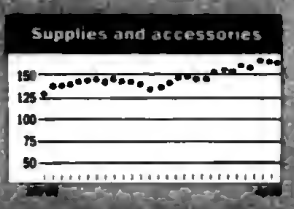
Computerworld stock trading index

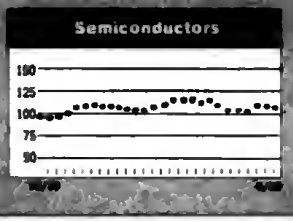


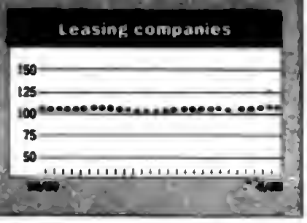












All indexes utilize a Dec. 31, 1982, base value which equals performance in relation to that base. The 30 most liquid issues make up computerized average computations of the 40 stocks in the CW industry index.

	4/23/86	4/30/86
Computer systems	126.7	128.7
Software and DP services	106.7	106.6
Peripherals and subsystems	123.0	122.2
Supplies and accessories	157.7	156.3
Semiconductors	108.3	110.6
Leasing companies	104.6	106.9
CW stock index	120.6	121.1
Standard and Poor's 500 stock index	144.6	146.3

Computerworld stock trading summary

CLOSING PRICES WEDNESDAY, APRIL 30, 1986

E X C N		52-WEEK RANGE (1)		CLOSE APR 30 1986	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS					
O	ALPHA MICROSYSTEMS	6-	9	6 1/4	-1/4	-3.8
O	ALTOS COMPUTER SYST	6-	IN	IN 1/4	+1 5/8	+9.2
A	AMDAHL CORP	10-	16	16	+1	+6.4
O	APOLLO COMPUTER	3-	31	15 3/4	0	0.0
O	APPLE COMPUTER INC	14-	31	30 1/4	+5/8	+2.1
N	AT&T	13-	38	24 3/4	-1/4	-1.0
N	BURROUGHS CORP	52-	71	NT	-1	-1.8
O	COMPAQ COMPUTER CP	8-	17	IN 3/4	+1/8	+0.7
O	COMPUTER AUTOMATION	1-	6	2 1/8	+1/4	+13.3
A	COMPUTER CONSOLES	9-	14	10 5/8	+7/8	+8.9
N	CONTROL DATA CORP	15-	39	22 7/8	+1	+4.5
O	CONVERGENT TECHNOL	8-	13	N 3/4	-1/2	-4.8
O	CPT CORP	5-	8	4 1/2	-1/8	-2.7
N	CRAY RESEARCH INC	25-	79	78 7/8	-1/2	-0.6
O	DAISY SYSTEMS CORP	11-	36	13 1/2	+1/4	+1.8
N	DATA GENERAL CORP	31-	76	41 5/8	-2 5/8	-5.9
N	DATAPOINT CORP	6-	22	5 1/4	+1/8	+2.4
N	DIGITAL EQUIPMENT	85-	161	170 1/2	-4 7/8	-2.8
A	EECO INC	13-	16	15	+1/2	+3.4
N	ELECTRONIC ASSOC.	3-	7	5 7/8	-1/2	-7.8
N	FLOATING POINT SYST	18-	42	42 1/4	+1 3/4	+4.3
N	FOXBORO	22-	31	27 1/4	-1/8	-0.4
N	GOULD INC	30-	38	35 3/4	-1 1/4	-4.8
N	HARRIS CORP	22-	35	32 1/4	+2 1/2	+8.4
N	HEWLETT-PACKARD CO	29-	35	35 1/4	-1/8	-0.2
N	HONEYWELL INC	54-	87	75 1/8	-1/2	-0.6
N	IBM	117-	138	136 1/4	+1	+0.8
O	IPL SYSTEMS INC	1-	4	2 1/2	0	0.0
N	ITT CORP	28-	47	47 1/8	+1/4	+0.9
N	M/A-COM INC	13-	24	18 7/8	+1/8	+0.7
N	MANAGEMENT ASSIST	2-	28	2 1/4	0	0.0
N	MATSUSHITA ELEC(ADR)	48-	86	38 5/8	+7 1/8	+7.8
O	MENTOR GRAPHICS	15-	20	17 1/2	-5/8	-3.4
N	MODULAR COMPUTER SYS	6-	9	8 7/8	+3/4	+9.2
N	MOHAWK DATA SCI	1-	13	3 1/8	N	0.0
N	MSI INC	11-	2	12 1/8	+1/8	+1.0
N	NCR	25-	90	90 1/8	-1/8	-0.1
N	PERKIN-ELMER	23-	36	32 1/8	+1 3/8	+4.4
N	PRIME COMPUTER INC	13-	37	21 3/8	+1 1/8	+5.4
N	SPERRY CORP	36-	58	58	+1/4	+0.4
O	STRATUS COMPUTER INC	3-	25	22 1/4	-1	-4.3
O	TANDEM COMPUTERS INC	13-	31	31	+2 1/8	+
N	TANDY CORP	24-	44	38 1/2	-7/8	-2.2
O	TELEVIDEO SYSTEMS	3-	4	3 7/8	0	0.0
N	TELXON CORP	16-	32	20 1/2	-1	-3.1
N	TEXAS INSTRUMENTS	86-	141	138	-1 3/4	-1.2
A	ULTIMATE CORP	3-	32	30 7/8	+1 5/8	+5.5
O	VECTOR GRAPHICS INC	1-	1	1/8	0	0.0
A	WANG LABS "B"	15-	29	IN 1/8	+2 1/4	+11.3
A	WANG LABS "C"	15-	28	18	+5/8	+2.1
N	XEROX CORP	37-	72	60	+1 1/4	+2.1
	SUPPLIES & ACCESSORIES					
N	AMERICAN BUS PRODS	21-	36	36 3/8	+1/4	+0.8
N	BARRY WRIGHT	17-	36	33 1/4	-1/4	-1.6
A	DUPLEX PRODUCTS INC	13-	22	21 1/2	0	0.0
N	ENNIS BUS. FORMS	14-	25	23 1/4	-2 1/8	-8.3
N	3M COMPANY	76-	107	104 3/4	+1 3/4	+1.6
N	MOORE CORP LTD	13-	37	38 1/2	+3/8	+1.4
O	STANDARD REGISTER	22-	38	41 3/4	0	0.0
N	WALLACE COMP SERVICE	30-	68	47 3/4	-4/8	-1.3

E X C N		52-WEEK RANGE (1)		CLOSE APR 30 1986	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & DP SERVICES					
O	ADVANCED COMP TECH	2-	N	9 7/8	+3/8	+13.8
N	ADVANCED SYSTEMS INC	3-	20	17 5/8	-5/8	-3.4
N	AGS COMPUTERS INC	10-	25	22 1/4	+1 3/8	+6.5
O	AMERICAN SOFTWARE	9-	15	10 3/4	+1/8	+1.1
N	AMACOMP INC	3-	8	8 7/8	+1/2	+10.3
O	ANALYSTS INTL CORP	5-	11	6 3/4	0	0.0
O	ASHTON TATE	6-	27	28 1/2	+1/8	+0.4
O	ASK COMPUTER SYSTEMS	7-	35	13 1/2	-1/4	-1.8
O	ASTRADYNE COMP IND	1-	3	1 3/4	0	0.0
N	AUTOMATIC DATA PROC	35-	70	58	-1 1/2	-2.1
O	COMPUTER NETWORK	6-	8	7 1/2	0	0.0
O	COMPUTER ASSOC INT'L	13-	42	42	+1 1/4	+3.0
O	COMPUTER HORIZONS	5-	11	13	-3/8	-2.8
N	COMPUTER SCIENCES	13-	38	35	+7/8	+2.5
O	COMPUTER TASK GROUP	10-	38	28	+1/2	+1.8
O	COMPUTER USAGE	1-	3	1 7/8	0	0.0
O	COMPUTONE SYSTEMS	3-	11	10 1/8	+1/8	+2.5
O	COMSERV CORP	1-	6	4 5/8	0	0.0
O	COMSHARE	7-	12	IN 3/4	+1/8	+1.1
N	CULLINET SOFTWARE	12-	22	14	+3/8	+2.7
O	CYCARE SYSTEMS INC	14-	27	13 1/2	+1/4	+1.8
O	HOGAN SYSTEM INC	4-	12	10 1/4	+1 7/8	+22.3
N	GENERAL ELECTRIC CO	56-	79	78 1/8	-3/4	-0.6
N	GENL MOTORS E (EDS)	20-	38	47 1/2	+1 1/8	+2.4
N	GTE CORP	38-	54	50 5/8	-1 1/2	-2.8
O	INFORMATION SCIENCE	1-	6	3 1/8	0	0.0
O	INFOTRON SYSTEMS CP	13-	24	18 1/2	+1 1/4	+8.7
O	KEANE ASSOCIATES	10-	20	IN 1/2	+1 1/4	+8.7
N	LOGICON	25-	43	35 3/4	-3/8	-1.0
O	LOTUS DEVELOPMENT CP	13-	38	35 1/2	+2	+5.9
O	MCI COMMUNICATIONS	7-	13	10 1/8	-1/4	-2.4
O	MAGT SCI AMER INC	7-	IN	13 7/8	-5/8	-4.3
O	MATHEMATICAL APP GRP	1-	8	1 7/8	0	0.0
O	MICOM SYSTEMS INC	13-	38	17	0	0.0
O	MICROPRO INT'L CP	3-	4	3 1/4	+1/8	+6.0
O	NATIONAL DATA CORP	8-	24	22 7/8	+1/8	+0.5
O	ON-LINE SOFTWARE INT	4-	14	13 3/4	+1/8	+0.8
N	RANSOPHIC SYSTEMS	14-	34	22 3/8	-1/4	-0.7
N	PLANNING RESEARCH	11-	23	21 1/4	+7/8	+4.2
O	POLICY MGMT SYSTS CP	18-	35	18 1/2	+1 1/2	+8.8
O	PROGRAMMING A SYS	4-	10	N 1/4	-1/2	-5.4
O	REYNOLDS & REYNOLD	30-	35	20 1/4	-1 3/4	-8.4
O	SEI CORP	13-	27	24 1/2	-1/2	-2.0
O	SHARED MEDICAL SYST	28-	36	37 1/8	-7/8	-2.3
O	SCIENTIFIC COMPUTERS	4-	N	4 5/8	0	0.0
O	SOFTWARE AG	12-	22	16 7/8	-7/8	-4.9
N	URS CORP	10-	IN	IN 7/8	-3/4	-4.2
N	UCOL	11-	20	20 1/8	-1/4	-1.2
O	Vist SOFTWARE	17-	26	25 1/4	+1 3/4	+7.4
	SEMICONDUCTORS					
N	ADVANCED MICRO DEV	22-	38	38 3/8	-1 1/4	-4.3
O	ADV'D SEMICONDUCTOR	7-	22	13	+1	+8.3
N	ANALOG DEVICES INC	16-	24	23 3/4	+3/4	+3.2
O	ANALOGIC CORP	11-	IN	12 1/2	+1	+8.8
N	APPLIED MAGNETICS CP	3-	19	18 1/4	+3/4	+4.0
O	AVANTEK	18-	29	21 3/4	-1/4	-1.1
O	HADCO CORP	3-	7	4 3/4	+5/8	+8.6
O	INTEL CORP	21-	33	28 1/2	-1/4	-0.8
O	MICRO MASK INC	3-	12	N 7/8	0	0.0
N	MOTOROLA INC	29-	38	38 5/8	-1 7/8	-4.6
N	NAT'L SEMICONDUCTOR	10-	15	14 1/8	-1/8	-0.8
N	TERADYNE	17-	33	27 3/8	+3/4	+2.8

E X C N		52 WEEK RANGE (1)		CLOSE APR 30 1986	WEEK NET CHNGE	WEEK PCT CHNGE
	PERIPHERALS & SUBSYSTEMS					
P	AM INTERNATIONAL	3-	N	7 3/8	-1/2	-6.0
A	ANDERSON JACOBSON	2-	5	2 1/8	0	0.0
O	AST RESEARCH INC	7-	33	20	-2 3/8	-11 N
O	AUTO-TROL TECHNOLOGY	3-	13	5 1/4	+1	+23.5
O	AVANT-GARDE COMPUTNG	3-	21	4 1/4	-1/2	-10.5
O	BANCTEC INC	6-	12	11 1/8	-5/8	-5.3
O	BEEHIVE INT'L	1-	2	1/8	0	0.0
N	BOLT BERANEK & NEW	20-	42	42 1/8	+3/4	+1.8
O	CAMBEX CORP	1-	2	1 1/4	0	0.0
N	CENTRONICS DATA COMP	3-	11	5 3/8	-1/2	-8.5
A	CETEC CORP	6-	N	N 1/8	-3/8	-4.4
A	COGNITRONICS	4-	7	5 1/8	-1/8	-2.3
N	COMPUGRAPHIC CORP	23-	36	23 1/8	-1	-4.1
O	COMPUTER TRANSCEIVER	0-	1	1	0	0.0
N	COMPUTERVISION CORP	6-	44	IN 3/8	+5/8	+3 N
N	COMRAC CORP	12	18	17 1/2	+5/8	+3.7
A	DATAPRODUCTS CORP	11-	30	15 3/8	0	-5.0
A	DATARAM CORP	4-	16	15 1/8	-5/8	-3 N
O	DATA SWITCH CORP	4-	N	7 1/2	-3/8	-4.7
O	DATUM INC	5-	N	8 3/8	+5/8	+6.2
O	DECISION DATA COMPUT	10-	20	12 1/8	+1/8	+2.2
O	ENDATA, INC	3-	N	N 5/8	+1/8	+1.9
O	EVANS &SUTHERLAND	12-	27	26 3/8	-5/8	-2.3
O	GANDALF TECHNOLOGIES	5-	13	N 1/2	1/4	-3.7
N	GENL DATA COMM IND	3-	21	11 7/8	+1/8	+1.0
N	HAZELTINE CORP	13-	30	18 1/8	-1/2	-2.8
O	ICOT CORP	3-	12	12 5/8	+3/8	+6.4
O	INFORMATION INTL INC	10-	17	13 3/4	+1 1/4	+10.0
O	INTECOM INC	3-	11	6 1/8	+3/4	+22.2
O	MEGADATA CORP	3-	N	3 1/8	3/8	-10.7
A	MSI DATA CORP	7-	13	12 3/8	+1 1/4	+10 N
N	NASHUA *CORP	24-	52	50 3/4	-1 1/2	-2.6
O	NETWORK SYSTEMS CORP	11-	27	13 7/8	-3/4	-5.1
N	RD AMERICAN PHILIPS	32-	47	45	-1 1/2	-3.2
N	NORTHERN TELECOM LTD	26-	41	30 1/4	+1 1/8	+3.8
O	OMEX	1-	3	3/8	0	0.0
N	PERIPHYNE CORP	6-	18	N 1/2	-1/2	-5.5
A	PENRIL CORP	7-	14	7 5/8	+1/4	+3.3
N	PLESSEY CO (ADR)	13-	38	37 1/2	+3 1/8	+9.0
O	PRINTRONIX INC	6-	IN	13 3/8	+3/4	+5.9
O	QMS INC	6-	IN	12 1/4	+7/8	+7.6
O	RAMTEK CORP	2-	7	4 1/4	+1/8	+3.0
N	RECOGNITION EQUIP	8-	17	13 3/4	+7/8	+6.7
N	SANDERS ASSOCIATES	30-	44	31 1/2	-10 1/4	-24.5
O	SCAN-TRON CORP	3-	22	18 3/4	-2	-9.8
N	SCIENTIFIC ATLANTA	10-	19	11	5/8	3.2
O	SEAGATE TECHNOLOGY	5-	13	12	1/4	2.0
N	STORAGE TECHNOLOGY	1-	5	4	-1/4	-5.8
O	SYKES DATATRONICS	0-	1	3/8	0	0.0
A	T BAR INC	3-	N	N 1/4	1/4	3.8
A	TAB PRODUCTS CO	14-	22	21	-1 3/8	-6.1
O	TANDON CORP	3-	N	5 7/8	0	0.0
A	TEC INC	6-	13	8	-1/8	-2.0
N	TEKTRONIX INC	47	68	38 1/2	+1 3/4	+3.0
N	TELEX	34-	58	NT	-1 1/4	-2.0
O	TESDATA SYSTEMS CP	6-	3	5/8	-1/8	-16.8
N	TIMEPLEX INC	13-	22	18 7/8	+1/2	+3.0
N	TITAN CORP	4-	11	10 1/2	0	0.0
O	VISUAL TECHNOLOGY	1-	3	5/8	1/16	-9.1
	LEASING COMPANIES					
N	COMDISCO INC	7-	24	22 1/4	-1 1/2	-6.3
N	CONTINENTAL INFO SYS	5-	21	20 3/8	+2 1/8	+11.4
O	FINALCO GROUP INC	4-	8	4 1/8	0	0.0
O	PHOENIX AMERICAN INC	2-	6	4 7/8	1/8	2.3
O	SELECTERM INC	3-	12	7 1/2	+1	+15.3
N	U.S. LEASING	32-	46	43	+3/4	+1.7

EXCH: N—NEW YORK; A—AMERICAN; P—PACIFIC; N—BOSTON; L—NATIONAL; M—MIDWEST; O—OVER-THE-COUNTER; S = SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID

(1) TO NEAREST DOLLAR

Source: Trade Quotes, Inc.

COMPUTER INDUSTRY

INSIDE

GEISCO pursues new applications as the time-share market fades/**113**

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Sperry ends a down year; Compaq reports another strong quarter/**120**

Control Data: An investor's bargain?/**140**

INSTANT ANALYSIS

"I am not convinced that corporate America needs an 80286-based machine on every desk."
— **Andrew M. Seybold, the Seybold Group, Inc.**

Akers sees 'demanding year'

Tells IBM shareholders cost controls will continue

By Clinton Wilder

HOUSTON — Warning of a "demanding year ahead," IBM President and Chief Executive Officer John F. Akers told IBM shareholders last week that Big Blue will continue its stringent controls on expenses and hiring until its U.S. business shows a significant pickup.

In remarks at IBM's 1986 annual meeting, Akers noted that the company cut discretionary expenses for travel and meetings by 10%, or $700 million, during 1985. He said such cost controls will continue and that IBM will reduce its hiring from college campuses much more than it did last year, to fewer than 1,000 graduates.

"We believe the prudent course for IBM is to expect a demanding year ahead, to make ourselves as a company as lean and vigorous as possible, and thus ready to take on our competitors when the turnaround comes," Akers said.

Akers did not predict when that might occur, but most indications so far in 1986 have pointed to another sluggish year for IBM and the mainframe industry in general.

In response to a stockholder inquiry about a potential stock split, Akers said the IBM board would not consider another split of stock without a significant improvement in its U.S. business. The company did, however, declare its regular quarterly dividend of $1.10 per share.

Although Akers refused to disclose specific product plans, he answered shareholder questions on the following product areas:

• System/36 and 38. Akers said IBM is working on hardware and software enhancements to provide better migration from its often-criticized mid-range sytems to 370-architecture mainframes. For the office environment, he said the company

See **AKERS** page 140

Olsen chides management

By Alan Alper

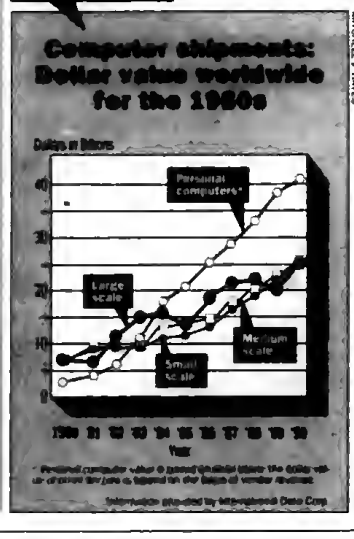
NEW YORK — The computer industry will not shake its debilitating doldrums until top managers at user corporations worldwide gain a better understanding of systems already installed and become more involved in the purchase of new technology, Kenneth H. Olsen, president and founder of Digital Equipment Corp. told a Wall Street gathering.

Speaking at a meeting of the New York Society of Security Analysts last week, Olsen said many of the industry's problems stem from tax laws that encourage corporations to purchase computers in excess of their needs, systems that in many cases cannot communicate with one another.

"People at the top are not used to getting involved," Olsen said. "They blame the computer industry for computers that can't talk to one another. I tell them,

See **OLSEN** page 117

DATA VIEW



MITCHELL HAYS

INDUSTRY INSIGHT
Edward Warner

Tandy, Apple show their age

Tandy Corp. and Apple Computer, inc. have two of the longest life spans of any of the players in the personal computer industry. This year, while both have announced increased profitability, both are also showing their age; they have too long relied on cash-cow products whose technology blossomed years ago.

Tandy troubles arise from the double whammy of being in the computer retailing business (a fairly unprofitable line of work) and marketing personal computers that are either technologically outdated or at the mercy of Asian underpricing.

Tandy may have announced a 92% increase in profitability in its recent third quarter, but the majority of that $42 million in earnings came from consumer electronics products; revenue from Tandy's Computer Centers and Radio Shack stores was flat.

That could spell trouble in the long run for a company that gets a full 30% of its revenue from computers and peripherals.

Earlier this month Paine Webber, Inc. said in a report that it had downgraded its expectation of Tandy's earnings per share in fiscal 1986 from $2.75 to $2.60. Paine Webber blamed Tandy's disappointing PC sales.

In its most recent quarter, Apple also showed increased profitability. The $31.8 million that it earned in that quarter, while three times the revenue of the same period a year ago, came as revenue dropped 6% to $408.9 million. Apple is not making money from ex-

See **TANDY** page 116

Warner is editor of the Computerworld News Service.

Future Computing shuts down

McGraw-Hill dissolves mart research subsidiary

By Clinton Wilder

DALLAS — Future Computing, Inc., once the leading market research firm specializing in microcomputer tracking, was formally dissolved last week by its parent company, publishing giant McGraw-Hill, Inc.

Future Computing, which was widely rumored to be experiencing heavy financial losses in recent months, will be absorbed by another McGraw-Hill research subsidiary, Datapro Research Corp. Delran, N.J.-based Datapro, which publishes a highly regarded annual survey of mainframe users, will hire about 20 of Future Computing's employees.

McGraw-Hill laid off 58 other Future Computing workers, and cofounder and Chairman Egil Juliussen will leave at the end of the month.

Future Computing's rise and fall coincided with the growth and shakeout of the micro industry. Founded in 1981 by Juliussen and his wife Portia Isaacson, Future Computing reached estimated revenue of $7 million in 1984. The cofounders sold the firm to McGraw-Hill in July 1984.

Many in the industry believe that Future Computing lost credibility through overly optimistic projections of growth in microcomputer markets. But McGraw-Hill denied that the unit's credibility was a factor in its decision to terminate the business.

IBM fires volley in war on PC clones, protects AT system box design in UK

By Ralph Bancroft and Charles Brown
Computerworld News Service

LONDON — In the latest battle in its UK war on Personal Computer clones, IBM registered the design of its Personal Computer AT system box, gaining protection against copying by other manufacturers.

By registering the design of the AT box under the Registered Designs Act of 1949, IBM gained 25 years' protection against copying of the AT box's look, even where the physical dimensions of the copy are different.

The action also closed a loophole that may have enabled one London clone supplier, Qubie Ltd., to sell PC AT look-alikes. Qubie Managing Director Roger Harvey said IBM lawyers have already written him to demand that his firm sign a written agreement to stop selling its BT AT model or face legal action.

Comcen Ltd., the British company chosen by the IBM PC Users Group for its so-called approved clone, recently changed its front panel and read-only memory BIOS to avoid litigation, although it insisted that none of the changes it made to its clones have come at IBM's urging.

According to Comcen Sales Manager Gary Stone, IBM's crackdown on the clones was predictable. "With the numbers of compatibles selling, IBM is bound to be upset," he observed. "We just want to keep our act clean."

Our most advanced personal computer advances again.

With the Personal Computer AT,* IBM put advanced technology to work. To help boost performance. .

But even advanced technology keeps advancing.

Now IBM introduces enhanced models of the Personal Computer AT–computers that raise high performance even higher.

Think fast.

For some people, fast isn't quite enough. So the new models of the Personal Computer AT run up to 33% faster.

That means you can recalculate even the biggest spreadsheets in a flash. And sort through your data with astonishing speed.

A choice of hard files to meet your storage needs.

Store more.

Big news for people who work with big files.

A Personal Computer AT can now store more information than ever. IBM gives you a choice of hard files (fixed disks)–including a 30-megabyte size that stores up to 15,000 pages of words and numbers.

And if that's not enough, double it. Just add a *second* 30MB hard file, for a total capacity of 60MB.

A new set of keys.

Today, you can select an IBM Personal Computer AT with an enhanced keyboard.

It has separate cursor keys, a separate numeric keypad (for easier data entry) and twelve function keys.

It also has a main typing section that's modeled after the classic IBM Selectric® keyboard, which makes word processing easier than ever.

Diskettes that are just your size.

With a new option, the Personal Computer AT can run 3.5-inch diskettes. (They're smaller, but can store twice as much information as 360KB 5.25" diskettes.)

A new option to let you run 3.5" diskettes.

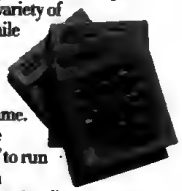
So now you can use programs and data in either format. And have the flexibility to work with other members of the IBM PC family that use 3.5" diskettes.

Including the new IBM PC Convertible.

Family ties.

With new IBM products, the Personal Computer AT can more easily communicate with other PCs.

IBM's networking options, for example, let you share files from a variety of popular programs. While the IBM PC 3270 Emulation programs let you retrieve information from a mainframe.


New programs to help you communicate with other PCs. And mainframes, too.

You can also use the Personal Computer AT to run IBM PC XENIX* –an enhanced multi-user, multi-tasking operating system.

A powerful value.

The best news is, the Personal Computer AT now offers increased power without a higher price.

And if you qualify, you can conveniently charge your Personal Computer AT on IBM's Credit Card. Or lease one with the IBM Commercial Lease Agreement.

See the new models of the Personal Computer AT at an Authorized IBM PC Dealer. Or call your IBM marketing representative.

For the name of a store near you, call 1-800-447-4700. In Alaska, call 1-800-447-0890.

IBM

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Which offers products that other software companies don't. And includes INFORMATION EXPERT.™ The fourth generation technology that allows all your existing or new software systems to talk to one another.

For more information, you can talk to people in the People's Republic. Or talk to people at MSA. Namely Robert Carpenter at 404-239-2000.

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